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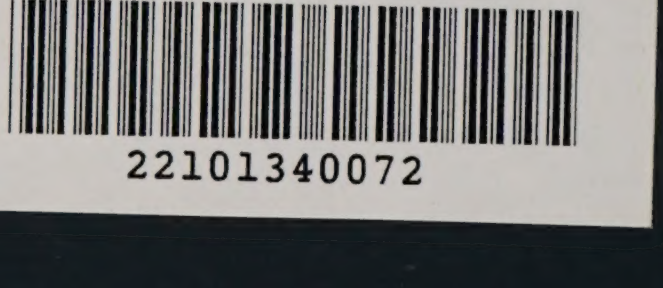
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# A SYSTEM

OF

# PRACTICAL THERAPEUTICS.

EDITED BY

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# VALEDICTORY.

WHEN the project of editing a System of Therapeutics first occurred to the Editor of this work, he little thought that he would be able to see it completed within one year of the time when the first prospectus was printed. The promptness of the contributors has made it possible to present the three volumes almost simultaneously without the unfortunate lapses of time which have occurred in the publication of other works. As a consequence, this SYSTEM represents the latest and best therapeutic methods, and the physician when he reads the first and last volume finds no difference in therapeutic thought, as would be the case had delay interfered with the rapid completion of the work.

The original method has been successfully attempted of presenting the subject of the treatment of disease as the keystone of medical practice, supported on either side by the various branches of medical science, upon a knowledge of which rational therapeutics must always rest. The therapeutics of the Anglo-Saxon race has always been the best that the world could produce, and the presentation of articles, each of which is written by an authority who is *facile princeps* in the study and treatment of the disease of which he writes, cannot fail to do much toward keeping therapeutics in America in the vanguard of practical medicine.

The Editor desires to express his sense of obligation to the gentlemen who have aided him in the production of this SYSTEM, and who will join with him in mutual congratulation at the favorable reception accorded to it by the profession.

222 S. FIFTEENTH ST., PHILADELPHIA,
May, 1892.

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# DISORDERS OF SECRETION, AND NEW GROWTHS.

By H. RADCLIFFE CROCKER, M.D., F.R.C.P.

## DISORDERS OF SECRETION.

### Acne Vulgaris.

Under this term are included the varieties *acne punctata*, *acne simplex*, *acne pustulosa*, and *acne indurata*. The first three are merely grades of development, and all are pustular inflammations in and around the sebaceous glands, the direct consequence of occlusion of the ducts by their own secretion, which when seated at the orifice of the duct is hardened, and from adherence of dust blackened at the top, and can be squeezed out, looking like a maggot and called a comedo. In acne indurata the obstruction is lower down in the duct, and the inflammation is not only also more deeply seated at first, but involves the adjacent connective tissue and forms a hard lump deep in the cutis, which gradually becomes more superficial, and softens but seldom bursts spontaneously, and if not punctured to evacuate the pus remains as an indolent painful swelling which is very slow in undergoing involution, and then leaves a permanent scar. In the first three forms the pustule is superficial from the first, and the black comedo always forms the centre of it.

The disease is essentially one of youth, commencing at puberty, when all the glands display increased activity, and seldom lasting after the age of thirty, even if untreated, and many get well spontaneously much before that time. It is, however, the cause of much disfigurement, its favorite seats being the face, chest, and back. In the face the forehead, temples, and nose are the parts chiefly involved, and in women the chin; but it is never seen in the hairy scalp. The chief etiological factors from within are the developmental period, the condition of the digestive organs, especially as regards constipation with or without anæmia, and in girls disorders of menstruation; locally a sluggish circulation, and a thick, indolently-acting skin are often, but by no mean always, associated with acne. The comedo is doubtless formed from an alteration in the quality of the secretion, as well as from the increased glandular activity of puberty; but what produces

that change of quality is unknown, the *Acarus folliculorum*, which is often found in the comedo plug, not possessing any etiological influence, as far as can be ascertained.

The treatment deducible from the foregoing considerations is as follows: Internally, all the functions should be carefully inquired into, and any derangement rectified as far as possible. Anæmia and constipation being frequently associated, the well-known Startin's mixture is often an appropriate prescription:

℞. Ferri sulphat., gr. ij;
Magnes. sulphat., ʒiss;
Acid. sulphur. dil., ♏xv;
Infus. quassiæ, ℥j.—M.
Ft. mist.
Sig. To be taken three times a day, immediately after meals.

The amount of the aperient of course should be adapted to each case.

Sometimes, again, milder preparations of iron would be preferable—*e. g.:*

℞. Ferri et quininæ citrat., gr. v;
Extract. cascar. sagradæ, fl., ♏xv;
Tinct. belladonnæ, ♏v;
Aquæ chloroformi, ℥j.—M.
Ft. mist.
Sig. Take three times a day, after meals.

In other cases, again, with a furred tongue and prominent papillæ, an alkaline mixture with a bitter tonic is preferable, such as the following:

℞. Sodii bicarbonatis, gr. x;
Tinct. nucis vom., ♏x;
Extract. cascar. sagradæ, fl., q. s.;
Glycerini, ♏xv;
Aquæ anethi, ℥j.—M.
Ft. mist.
Sig. To be taken twice or thrice a day, an hour before meals.

In girls the eruption very frequently undergoes an exacerbation just before the catamenial period is due, even when there is nothing wrong with that function. This may often be obviated by keeping the bowels free by saline aperients for a few days before the period. A Seidlitz powder every other morning, commenced so that three shall have been taken before the onset of the period, is often a suitable means of attaining the end in view.

The foregoing are given only as examples of cases which are frequently met with. Few remedies are of direct service. When suppuration is very free, calx sulphurate, 1 grain three times a day, in coated pilules, may be tried, and ichthyol in the dose of 3 to 5 minims, three times a day, has its advocates; but it has never been of much service in my hands, although it is sometimes useful in acne rosacea.

The local indications for treatment are twofold: First, for the removal of the comedones, and secondly, the cure and prevention of the pustules. For the comedones, as violent pressure is apt to set up the inflammation it is wished to prevent, steaming the face or holding in contact with it sponges dipped in water as hot as can be borne is a useful, and often necessary, antecedent for the removal of the sebum plugs. They may then be mechanically removed by squeezing them out with the nails, or by pressure by means of a watch-key placed over the comedones, which makes them rise up, so that they can be easily removed. Many mechanical contrivances, consisting of tubes or small cups with a hole in the centre, are used for a similar purpose. Clover's instrument and Piffard's modification of comedo-extractors are good examples. When on the trunk, cold sponging, especially with sea-water, and vigorous rubbing with a towel are often of service, or a towel may be dipped in sea-water and then the back freely rubbed with it. Other means are soft-soap liniments, such as Hebra's *spiritus saponis viridis* (green soap) and spirit of wine, of each 1 ounce, with 20 minims of oil of lavender. Moistened flannel is to be dipped in the liniment and rubbed firmly over the part where comedones are abundant. This softens and facilitates the removal of the fatty concretion. The author often uses a similar but pleasanter application—viz.:

℞. Saponis mollis, ℥j;
Aquæ Cologniensis, ℥j.—M.
Ft. linimentum.

If these soap applications produce irritation, as sometimes happens with delicate skins, they must be used only two or three times a week, and glycerite of starch or toilet lanolin used in the intervals. When pustules are present, sulphur applications find an appropriate place. One of the best, in the author's opinion, is that used by Erasmus Wilson:

℞. Pulv. sulph. hypochlor., ℥j;
Adip. benzoinat., ℥j;
Essen. amygdalæ amaræ, ♏v.—M.
Ft. unguent.
Sig. To be rubbed into the pustules every night.

Sulphur lotions are also used, such as—

℞. Sulphur. sublimati,
Spirit. vini,
Glycerini,
Æther., āā. ʒij;
Aquæ sambuci, ℥vij.—M.
Ft. sol.
Sig. To be sponged on night and morning.

Spirit of camphor may sometimes replace the plain spirit.

Sulphur may also be used as a face-powder:

℞. Sulphur. præcip. pur., ℥j;
Pulv. amyli, ℥ij;
Olei rosæ, q. s.
Sig. To be applied with a powder-puff two or three times a day.

The following ointment is sometimes used:

℞. Resorcin, gr. xx;
Unguenti, ℥j.—M.
Ft. ung.
Sig. To be rubbed on the part every night.

Unna strongly advocates ichthyol either as lotion or ointment. It is a sulphur-containing drug, and is beneficial in many cases, but is more disagreeable than the hypochlorite of sulphur, and is certainly not more effectual. Unna also gives it internally, 3 to 5 minims in water thrice daily. Thiol is a similar application, and being odorless has an advantage over ichthyol; it may also be prescribed as a powder as well as a liquid—*e. g.*:

℞. Thiol., ʒj;
Lanolin., ʒij;
Adip. benzoinat., ℥j;
Olei rosæ, ♏iv.—M.
Ft. unguent.
Sig. Apply locally.

In Germany stronger applications are used than in England or America. Thus Vleminckx's solution[1] is recommended at the Vienna

[1] Lime 1 part, sulphur 2 parts, and water 20 parts. Slake the lime, add the sulphur, and boil to 12 parts.—Editor.

School, or bichloride of mercury, $\frac{1}{3}$ to $\frac{1}{2}$ per cent. lotions with $\frac{1}{3}$ alcohol, and Lassar of Berlin recommends a treatment strong enough to induce peeling of the cuticle. These methods no doubt are effectual, but they necessitate the patients' giving themselves up to the treatment, and are certainly not essential, for equally satisfactory results may be obtained by milder measures. Besnier's lotion is—

| | |
|---|---|
| ℞. Sulphur præcip., | ℥jss ; |
| Glycerini, | f℥iv–vj ; |
| Ft. in magma, et adde | |
| Spirit. camphoræ, | f℥vj ; |
| Aquæ rosæ, | q. s. |

The above formulæ, although not a type of what might be mentioned, are sufficient to show the line of treatment to be followed, and each practitioner may make modifications as he finds necessary. There remains one other method which, when practicable, is most efficacious if thoroughly carried out. Each pustule is a nidus for staphylococci, and leads to the formation of fresh pimples. Each one, therefore, should be punctured, its contents thoroughly evacuated, and then an antiseptic rubbed in thoroughly. Iodoform is the best, but too disagreeable for ordinary use. Iodol or aristol therefore may be substituted. A small pledget of alembroth wool should then be placed over the puncture and fastened with collodion. At first the puncturing should be done daily, but the pustules soon diminish, and once or twice a week is generally sufficient, and in a few weeks only an occasional pimple requires puncture.

In order that the treatment should be effectual, it must be remembered that as soon as there is a visible red pimple, it contains pus, though deeply seated, and if punctured without waiting for the pus to become superficial, it heals at once without a scar, which is the usual result of leaving the pustule to itself. The prevention of a scar is sufficient inducement for the most timid to overcome the natural repugnance to any form of cutting. Kaposi devised for self-use by the patient a small lancet, with a shoulder to prevent the puncture being more than one-eighth of an inch deep, but it is difficult to make the patient go deeply enough, few having the knowledge or determination to push the instrument steadily in until the pus is reached, most persons giving themselves only a sudden prick, which, from the skin being lax, usually results in an ineffectual puncture.

Acne vulgaris is an obstinate affection, and frequently requires a long course of judicious and persevering treatment, but nearly always yields eventually, though slight recurrences cannot invariably be entirely prevented until the patient has passed the acne age—*i. e.* is twenty-five

to thirty years old; but even before this it can be kept within narrow limits.

## Acne Rosacea.

*Synonyms.*—Gutta rosea; *French*, Acné rosée, Couperose; *German*, Kupferrose.

Acne rosacea differs from acne vulgaris, inasmuch as the acne element is only a part, and that a secondary one, of the process. The commencement of the affection is a reflex congestion of the face, especially of the nose, cheeks, and chin, the result of indigestion, and therefore usually following a meal, or sometimes it may be from uterine or ovarian irritation, though even then dyspepsia is often an associated and aggravating condition. It might therefore be called dyspeptic acne, just as acne vulgaris is often called the acne of adolescence. Acne rosacea seldom begins before the age of thirty—just when, in fact, the tendency to acne vulgaris generally ceases. This is simply because few people are confirmed dyspeptics before the age of thirty. While minor degrees are most common in women, the most severe forms are met with chiefly in men, from the effects of alcoholic excess and exposure to extremes of temperature, the worst naturally being seen when these deleterious agencies are combined, as in coachmen.

The congestion alluded to, at first temporary, becomes permanent, the vesicles remaining dilated. The walls of the vessels eventually become thickened, and in extreme cases, where the cause has continued without alleviation or removal, a connective-tissue growth occurs round the vessels leading to the knobby noses, so well known as the "bottle-nose" of drinkers. The acne pustules are a secondary result of these vascular changes, and are certain to occur sooner or later.

It is obvious from the above considerations that the first duty is to correct the disorder of the alimentary canal, or, if necessary, of the uterus or ovary. The bowels must be regulated by laxatives, such as the fluid extract of cascara, compound sulphur lozenges, or compound liquorice powder, or by natural saline aperients, such as a tea-spoonful of the natural Carlsbad Sprudel salt in two-thirds of a tumbler of warm water, two or three mornings a week before breakfast, or a wine-glassful of Hunyadi Janos or other similar aperient water, with one-half a tumbler of tepid water. A visit to alkaline spas is useful for gouty people, who may go to Vals, Vichy, Wiesbaden, Contrexeville, or Rogat. Alkaline mixtures with vegetable bitters, often with strychnine or nux vomica, examples of which are given under Acne vulgaris, may be indicated; in short, all the means which are suitable for the treatment of dyspepsia in its various phases find an appropriate use according to circumstances.

Ichthyol, in doses of 3 to 5 minims in water, or in the form of pill

three times a day, is strongly recommended by Unna, and is certainly, in the author's opinion, more useful in this form than in acne vulgaris. It is most useful in cases dependent on uterine irritation, especially when there is uterine catarrh or when the dyspeptic symptoms are only slight. In suitable cases it seems to promote the contraction of the dilated vessels of the face, but it should not be given if there is decided gastric irritation, as it often aggravates, or even causes, dyspepsia.

Locally, the pustules require the same treatment as those of acne vulgaris; and here, again, the author gives the first place to the *unguentum sulphuris hypochloridi*, freshly made and rubbed in every night, or, where it is practicable, the puncture and disinfection of each pustule. (For the details of these and the other methods recommended for the pustules of acne the reader is referred to Acne vulgaris.) Lotions to reduce the hyperæmia are often required, and they may be made to partially conceal the abnormal and disfiguring redness. Either of the two following is frequently prescribed by the author:

℞. Calaminæ rub., f℥iij;
Zinci oxidi, ℥ij;
Glycerini, f℥j;
Hydrarg. chlorid. corrosiv., gr. j;
Aquæ rosæ, ℥iv.—M.
Ft. sol.

Sig. To be painted on with a large camel's-hair brush and allowed to dry, the whole being smoothed over with the finger or cotton wool.

The other is—

℞. Bismuth. subnitrat., ℥ss;
Zinci oxidi, ℥ij;
Glycerini, ℥j;
Hydrarg. chlorid. corros., gr. j;
Aquæ sambuci, ℥iv.—M.
Ft. sol.

Sig. To be used in the same way as the first lotion.

If it is preferred to make the latter lotion pink, 1 to 2 drachms of the compound tincture of lavender may be added.

When the vessels are permanently dilated, the best plan is to occlude them by electrolysis. A fine needle attached to the negative pole is introduced into the vessel, while the patient grasps a carbon cylinder covered with chamois leather wetted with salt and water. A few cells only of a constant battery are employed, so as to produce a current of 2 or 3 milliampères. Fine bubbles of gas are produced, and can be

seen in the blood-vessels travelling in the direction of the blood-current, and the course of the vessel becomes white. After from fifteen to twenty seconds the needle may be withdrawn, and introduced into another vessel, or a different part of the same one if large enough. It is not always possible to do all at one sitting, as there is a temporary increase of redness of the nose, so that the vessels cannot be seen. Some divide the vessels with or without applying nitrate of silver in a fine point to secure occlusion; this is effectual, but leaves a scar, which electrolysis does not if properly performed.

Multiple scarification is also recommended, but this should be reserved for cases of permanent redness without visible dilated vessels. It should be done down the nose and across it obliquely in two or three directions, and then a piece of antiseptic wool, such as alembroth or boracic, strapped on with broad strips of plaster. The operation often has to be repeated several times, but the result is worth the trouble if the internal treatment is satisfactorily carried out. Balmanno Squire, Pick, and others have devised instruments with multiple lancets, while Vidal and his colleagues use a single lancet. Some recommend Pacquelin's cautery stroked over the nose, and Unna has devised a modified form of the heated iron for this and similar purposes which he calls a "*mikrobrenner*."

In the most aggravated cases, where there are knobby outgrowths which occasionally develop into large, pendulous tumors, they can be removed by the knife and the nose trimmed into shape almost to the cartilages, as it heals readily, with most satisfactory results, a smooth white surface being obtained.

Continental authorities advocate more vigorous treatment. Thus, Brocq says: "The principle of nearly all efficacious local treatment is to excite inflammatory attacks of varying intensity, according to the requirements of the case. . . . . Then subdue the inflammation by soothing methods, such as emollient poultices or ointments. When the inflammation has been thus subdued, it will be found that amelioration is in proportion to the intensity of the irritation excited, and another attack may be induced, followed by the soothing treatment, and so on."

A prescription of Besnier's is—

| | | |
|---|---|---|
| ℞. | Sulphur. precip., | ℥jss; |
| | Glycerini, | f ℥j; |
| | Spiriti camphoræ, | f ℥iij. |

Brocq recommends for rebellious cases that black or green potash soap, with a little alcohol to render it manageable, be spread on a piece of flannel and laid on the face, for all night if possible, and in the

morning the face be bathed with water as hot as the patient can bear. If it can be borne, a fresh plaster may be put on for the day, or at all events on the next night, and the treatment should be continued until the swelling and inflammation prevent any further application, which may happen after the first or second plaster. During the day an ointment may be applied, such as—

| | | |
|---|---|---|
| ℞. | Tinct. benzoinat., | ♏xv; |
| | Acid. salicyl., | gr. iiss; |
| | Sodii borat., | gr. xv; |
| | Zinci oxidi, | gr. xxx; |
| | Vaselini, | ʒvj. |

Both in America and Vienna, Vleminckx's solution is used, at first diluted four or five times, and afterward undiluted. It is applied for some minutes, and then the face is bathed with very hot water. The practitioner is warned, however, that these strong applications had better be left in the hands of experts. They are very rarely necessary, and necessitate the patient giving up his employment and going into retirement. The author finds the treatment just laid down sufficient for nearly all cases, and the secondary results, such as the dilated vessels and tumors, should be treated by surgical means, following which the disfigurement is of very short duration, while dilated vessels alone may be cured by electrolysis without any disfigurement at all.

Elaborate directions as to dietary have not been given, as they are the same as those for the different varieties of dyspepsia, but alcohol in all forms should be very sparingly if at all permitted, beers and effervescing wines being especially injurious. The spas indicated, if it is desired to resort to such places, are those containing sulphur for local use, and are alkaline and laxative when taken internally. They are often combined, as at Harrowgate, England, in the same district.

## Acne Varioliformis.

*Synonyms.*—Acne frontalis, Acne atrophica, Acne necrotica, Acne rodens, etc.

This is a rather rare disease, situated chiefly about the forehead, at the junction with the hairy scalp, and going back into the hair, which acne vulgaris never does. It is especially abundant in most cases on the temples, and sometimes spreads by successive attacks over the face, and may affect the trunk. It is a disease of adult life, but may occur before the age of twenty years. The disease occurs in irregular groups of indolent pustules, with a hard central necrotic scab, which presses into the skin, and when separated leaves a deep pit, at first dark red, but

eventually becoming white, exactly like a small-pox scar. The disease is very chronic, being kept up by successive crops, and may recur again and again. The etiology is unknown. In some cases there is a history of syphilis, but in many there is no evidence of it. The treatment internally is with full doses (15 to 20 minims) of the tincture of chloride of iron, well diluted, three times a day after food, or if this fails iodide of potassium in 5-grain doses should be given, with decoction of cinchona or some vegetable bitter. Locally, a weak mercurial ointment should be constantly applied. One of the best is—

℞. Hydrarg. ammoniat., gr. xx;
Adipis benzoinat., ℥j.—M.
Ft. unguent.
Sig. Apply frequently.

## Comedones.

The term "comedo" is applied to the plug of hardened sebum which is not infrequently seen at the orifice of the hair-follicle. It is black at the top from adherent dirt, and when pressed out looks like a maggot with a black head. It often, but by no means always, contains a parasite known as the *Acarus* or *Demodex folliculorum*, but this is not known to have any pathological significance in the human subject. Comedones occur most commonly, at puberty and afterward, in association with, and as the immediate cause of, the pustules of acne vulgaris, and the treatment for their removal is described under that disease.

As a less frequent condition they are seen in irregular groups or masses in children, chiefly on the forehead, and in a minor degree on the occiput and sides of the head—the position, in short, in which a hat or cap is most closely in contact with the head. Occasionally they may be seen in other parts of the face, and even on the trunk. In this form pustular inflammation around the plug is a less constant occurrence than it is in acne vulgaris, and in some children, though the comedones are in large numbers, pustular inflammation may be absent. The *Demodex folliculorum* is not found in this form, but some form of microbe is doubtless present, as there is some reason to suspect that these grouped comedones in children are communicable, probably from wearing each other's head-gear, and they are certainly not dependent on any special departure from the general health. The treatment, therefore, is purely local. After steaming or rubbing in soft-soap liniments, as in the comedones of acne, germicides, such as glycerite of borax or bichloride-of-mercury solutions 1 : 500, may be applied by rubbing. This treatment, with a little perseverance, is always successful.

Another form of grouped comedones is seen in rare instances in symmetrical patches on the malar eminences and down to the outer side of the angles of the mouth. Their etiology is obscure, but the cases which have fallen under the author's notice have been in dyspeptic sufferers. Treatment directed to the digestion is therefore indicated, and examples of prescriptions are given under Acne rosacea and vulgaris. Locally, milder soap preparations than are used for acne vulgaris suffice, such as Manilla soap or—

℞. Sapon. mollis., ℥ij ;
Aquæ Cologniensis, ℥ij.—M.
Ft. liniment.
Sig. To be rubbed on at night; calamine lotion, of which the formula may be found under Acne rosacea, should be applied three or four times a day, being allowed to dry.

## Milium.

This term is applied to the small white pin-point to pin-head-sized white masses imbedded in the skin of the face, which are common at all ages from infancy upward. They are also seen in groups on the site of pemphigus bullæ on the extremities, and sometimes follow superficial inflammations, like erysipelas, or occur in cicatrices. In the middle-aged and elderly they may also be seen in groups in the eyelid toward the inner canthi, and sometimes coalesce into tumors from a pea to a bean in size. The treatment is simple. A small incision over them is made with a sharp scalpel, and then with very slight pressure a small white globe is expressed, consisting of fatty epithelium and cholesterin. In the larger ones calcareous salts may be deposited, the so-called cutaneous calculi. Sometimes they form tumors in connection with the Meibomian glands from a pin head to a pea in size, or even larger. The incision for their removal should be made on the mucous membrane side, to prevent a visible cicatrice.

## Seborrhœa.

*Synonyms.*—Stearrhœa; Acne sebacea; *Fr.* Acné sébacée, seborrhœ; *Ger.* Schmeerfluss, Eczema seborrhoicum.

There has been much discussion of late years with regard to the nature and pathology of this affection, not only as to whether it is merely an alteration and increase of sebaceous secretion or an inflammation, but also whether it is not the sebaceous glands, but the sweat-coils which are at fault. Unna, following Meissner's views, that the coil part of the sweat-glands secretes oily products instead of sweats. This is not the place to pursue this discussion, and it is only necessary to state the clinical varieties generally included under the term as a foundation for

intelligent treatment. The disease varies much according to the region attacked. Seborrhœa capitis is by far the most common, and may be seen either as simply fine dry scales (pityriasis capitis, dandruff) or as crusts of a dirty yellow color, more or less adherent to the scalp and around the hairs, consisting of fat and epithelium, while there are intermediate conditions of all grades. Both these forms are most marked in the vertex and occiput, but the fatty form more especially may spread over a wider area, and even for a short distance (one-half to one inch) beyond the hairy scalp, to the adjoining skin. In both forms, when the scales or crusts are removed no sign of inflammation is discernible, the skin beneath looking white and perfectly healthy. In a certain proportion of cases, however, inflammation supervenes, and there is marked redness, with abundant desquamation of fatty scales. This usually spreads beyond the hair, and is more justly entitled to the term "seborrhoic eczema," though the surface is seldom moist and the border is sharply defined.

In all the foregoing conditions the nutrition of the hair is interfered with: it becomes dry and lustreless, the root atrophies, and the hair falls out. Dry seborrhœa is the commonest cause of baldness in young men from twenty to thirty-five years old, and even in older men, in young girls temporarily, and of permanent baldness in women generally. It is for the loss of hair that medical advice is generally sought, the patient not complaining of the seborrhœa except when the powdery scales are so abundant as to cause annoyance.

There is yet another condition, in which there is an excess of oily secretion on the surface (seborrhœa oleosa). This does not lead to alopecia, and the face is generally affected, having a greasy appearance and feel, making it look dirty from the dust adhering to it. The complexion is generally thick and muddy-looking, and the patients are, as a rule, young adults. In infants the sebaceous secretion is sometimes allowed to remain on the scalp from timidity on the part of the mother, and may form a dirty yellow mass of varying thickness and cheesy consistence. When raised up, the skin beneath is usually quite healthy unless the decomposing crust has irritated it.

The treatment is simple. Rub in some olive oil to soften the crusts; then wash thoroughly with soap and water until they are all removed. A little benzoated zinc ointment may be applied for a few days if there is any hyperæmia. In seborrhœa oleosa pure precipitated sulphur, scented with attar of roses, may be applied two or three times a day with a powder-puff, or equal parts of the sulphur and cimolite may be substituted. Iron and cod-liver oil internally are often indicated.

In seborrhœa sicca capitis, which is doubtless due to a micro-organ-

ism, though the exact form has not been demonstrated, parasiticides are indicated. Sulphur stands first:

℞. Sulphur. sublimati, gr. xx;
Thymol., gr. xv;
Lanolin., ʒiij;
Ol. amygd. dulc., ʒiij;
Adip. benzoinat., ʒij.—M.
Ft. unguent.

Sig. The ointment to be rubbed into the vertex and occipital regions every night.

The head should be washed once a week with a soap-wash, such as—

℞. Saponis mollis, ℥j;
Aquæ Cologniensis, ʒij.—M.
Ft. liniment.

Sig. To be applied with wet sponge and warm water, and the following pomade rubbed in after drying the hair:

℞. Hydrarg. chlor. corros., gr. j;
Aquæ rosæ, ʒj;
Lanolin., ʒij;
Ol. amygd. dulc., ʒij;
Adip. benzoinat., ʒij.—M.
Ft. unguent.
Sig. To be rubbed in every night.

This treatment is serviceable both for the pityriasis form and for fatty crusts.

Where ointments are too troublesome, or in cases of moderate severity, lotions may be employed:

℞. Hydrarg. chlor. corros., gr. ij;
Ammon. chloridi, gr. x;
Resorcin., gr. xx;
Aquæ Cologniensis, ℥ij;
Glycerini, ʒij;
Aquæ rosæ, ad. ℥viij.—M.
Ft. solutio.
Sig. To be sponged in every night.

The patients should be warned that the manipulations necessary for

the treatment bring out the loose hair, or they may think they are getting worse. As cases are tedious, it is often desirable to change the application, if only to encourage the patient. Other formulæ are—

| | |
|---|---|
| ℞. Resorcin., | gr. xxx; |
| Hydrarg. chlor. corrosiv., | gr. j; |
| Lanolin., | ʒij; |
| Ol. amygdal. dulc., | ʒij; |
| Adipis benzoinat., | ʒij. |

Other preparations of mercury are also useful, such as 2 drachms of nitrate of mercury to 6 drachms of lard, and many other antiseptic applications will occur to the practitioner.

When there are marked inflammatory symptoms present, the sulphur must be very weak and combined with astringents:

| | |
|---|---|
| ℞. Sulphur. sublim., | gr. v; |
| Ung. zinci oleat., | ʒj; |
| Ol. lavand., | ♏v. |

Or,

| | |
|---|---|
| ℞. Pulv. acid. borici, | ʒss; |
| Resorcin., | gr. v; |
| Adip. benzoinat., | ʒj.—M. |
| Ft. unguent. | |

Or,

| | |
|---|---|
| ℞. Thiol., | gr. x; |
| Ung. zinci benzoinat., | ʒj.—M. |
| Ft. unguent. | |

Sig. One of these ointments should be applied several times a day, so that the affected area is constantly covered with the ointment.

The general health is usually faulty in these cases. The seborrhœic condition in the ordinary form has often existed for a long period, until the health broke down from worry or other causes, when the inflammatory symptoms supervened. Means to combat the unhealthy condition must be adopted. The digestive tract must be studied, and tonics of a suitable kind prescribed. Arsenic is of service only when indicated as a general tonic, and then should be given in small doses.

Internal treatment may or may not be called for. Sometimes no defect in the general health can be found, and then local treatment is all that is necessary. At other times the disease can be traced to a recent illness, to mental worry, or to debility from some cause which should be carefully sought for, and as far as possible removed, and suitable tonic medicines and regimen prescribed. Iron, cod-liver oil, arsenic,

and strychnine, with or without the mineral acids, are the class of tonics most frequently required. In any case the internal treatment is indirect rather than direct. Where there is a history of previous syphilis, bichloride of mercury may be combined with perchloride of iron. Sometimes in seborrhœa oleosa precipitated sulphur in ½-drachm doses, in milk, night and morning, is useful.

Seborrhœa of the scalp is often associated with a condition described under various names as seborrhœa corporis by Duhring; lichen circinatus serpiginosus by Erasmus Wilson; flannel rash, etc. Rings of papules with a fawn-colored staining in the centre and on the site of old lesions are found on the back, especially the interscapular region and the middle of the front of the chest, which is sometimes much discolored, almost like tinea versicolor. Almost any local antiseptic will remove it. The following are useful formulæ:

℞. Thymol. *vel* resorcin., gr. xx;
Adipis benzoinat., ℥j.—M.
Sig. To be rubbed into the affected part night and morning.

℞. Sulphur. sublimat., gr. x;
Acidi carbolici, ♏x;
Adipis benzoinat., ℥j.—M.
Sig. To be rubbed in with flannel night and morning.

Glycerin of borax may be used in the same manner.

The disease is very apt to recur, from the cure being apparent rather than real. Immediate resumption of the treatment is then necessary. It must be borne in mind that the seborrhœa of the scalp also requires attention, as there is reason to believe that micro-organisms from the seborrhœa capitis excite the eruption on the trunk. Brocq states that circumscribed inflammatory patches of seborrhœa capitis coexist with the trunk affection, but in the author's experience the coexistence of the ordinary seborrhœa capitis is much more frequent.

## Molluscum Contagiosum.

*Synonyms.*—Molluscum sebaceum; Acné varioliformé (Bazin); Molluscum verricosum (Kaposi).

This disease does not consist, in the true sense of tne word, of new growths, but appears as pearly-looking sessile tumors from a pin's head to a pea in size, with a central depression at the top, chiefly on uncovered parts of the body, and more frequently in children than adults. They formerly were considered to be altered sebaceous glands, but are now known to be formed from the epithelial layer, the cells of which undergo a peculiar degenerative change until they are entirely con-

verted into the so-called "molluscous bodies." The change is doubtless due to some organism the nature of which has not yet been determined. The evidence that they are to some degree contagious is, to the author's mind, conclusive, but some authorities still dispute this.

The treatment is simple and effectual. Each little tumor should be split across from below upward with a sharp knife; then pressure made with the handle of the scalpel and the thumb-nail at right angles to the incision, and the contents evacuated. Some recommend rubbing the interior of the pseudo-sac with nitrate of silver, but it is unnecessary. The small tumors may be simply touched with the acid nitrate of mercury. If suppuration has occurred, a rather free incision may be required.

## Anidrosis.

Absence of perspiration is generally a symptomatic condition, and rarely requires separate treatment. It is of all grades, from slight diminution up to complete absence. When congenital, as in scleroderma, the absence of sebum, which is quite as important, can be made up by the external application of fats, but nothing can be done to supplement the lack of perspiration.

When acquired and apparently idiopathic, a general invigoration of the system should be aimed at, and shampooing may be resorted to after warm alkaline baths—*e. g.* 4 ounces of bicarbonate of sodium to 30 gallons of water at a temperature of 102° F., the patient remaining in ten minutes, or vapor-baths at a temperature not exceeding 110° F. may precede the shampooing. Turkish baths should be avoided, as they often induce severe headache and other unpleasant symptoms where perspiration is absent.

When due to diabetes, albuminuria, or fevers, the treatment appropriate to the general condition should be employed, and in albuminuria vapor- and hot-air baths often have a prominent place. In addition to xeroderma, sweat is often absent in such skin diseases as anæsthetic leprosy and similar nerve conditions, scleroderma, eczema, psoriasis, and cases in which the horny layer is thickened; but the absence of sweat scarcely requires special treatment.

## Hyperidrosis.

Hyperidrosis may be of all grades of severity, from slight to severe enough to lead to the death of the patient from exhaustion; but the latter is extremely rare. It may affect the whole body or be limited to one or more regions. It may be symptomatic, as in acute rheumatism, rickets, pyæmia, phthisis, ague, or the "sweating sickness," one of the plagues of the Middle Ages, but still occasionally met with in an endemic form, chiefly in France. The sweating in these cases does

not require separate treatment, except as regards cleansing the patient. What may be called idiopathic hyperidrosis calls for our attention chiefly as regards sweating in a comparatively limited area. It may be paraplegic or hemiplegic, or limited to the course of a single nerve, or at all events to a single vaso-motor area. These cases are doubtless due to defective innervation, of which the original cause may or may not be detectable, but, whether traumatic or due to disease, the immediate effect is to paralyze the sympathetic of the affected region.

The treatment will be successful in proportion to our ability to detect and remove the cause of the neurosis. Too frequently in the directly neurotic cases this is not possible. Occasionally a slight neuritis may be set up in a gouty or syphilitic patient. The fact of a local hyperidrosis occurring in such a patient might suggest the correct line of treatment. In all cases a thorough examination of the patient should be made in order to detect or rectify any departure from health, and general tonics, such as the mineral acids, iron, quinine, strychnine, cod-liver oil, or small doses of liquor acidi arseniosi may be found to be suited to the general condition of the patient, and helpful proportionately for the sweating, so far as general treatment can be serviceable.

Hyperidrosis may be bilateral and less obviously neurotic, as is frequently seen in excessive sweating of the palms, soles, axillæ, and genital regions. Sweating of the palms alone may be, and very often is, of congenital origin, and then, of course, we are powerless so far as cure is concerned. On the soles, axillæ, and groins it is often associated with an offensive odor, and requires special local treatment to counteract that symptom. (See Bromidrosis.) When general indications fail, special drugs known to check sweating may be tried. Of these, I put most faith in sulphur, used as described in the treatment of Bromidrosis, and it is very often effectual without other treatment. Belladonna also claims a high place, but is more often temporarily than permanently successful; it may be given in the form of tincture, beginning with 10-minim doses three times a day, and increasing it up to the physiological limit of the patient. When the patient can be seen daily, hypodermic injections of atropine sulphate are preferable, being more certain and immediate in their action. The dose at first should be $\frac{1}{150}$ of a grain, increasing up to $\frac{1}{60}$ of a grain or more if the patient is tolerant. Agaricin hypodermically, in the dose of $\frac{1}{6}$ of a grain, has been recommended, chiefly in the night-sweats of phthisis, but the author has had no personal experience with it. Fluid extract of ergot, $\frac{1}{2}$ drachm, has been useful in some cases, and oxide of zinc, 5 grains made into a pill with or without $\frac{1}{4}$ grain of extract of belladonna, three times a day, is worth trying. The fluid extract of coca, in 1-drachm doses three times a day, has also been recommended.

Local treatment should always be tried. Belladonna ointment or liniment may be rubbed in twice a day for five minutes at a time. "Sanitary rose powder," as a pleasant way of using boric acid, may be applied with a powder-puff. A 1 per cent. solution of quinine is strongly recommended by Fox. Faradization of the part where the cause is supposed to be faulty innervation is sometimes successful, and the other local remedies recommended for bromidrosis should be tried in obstinate cases. Astringents, such as 1 or 2 per cent. of alum or tannin in alcohol, painted on two or three times a day, are also worth a trial. Holding a very hot sponge to the part for a few minutes will check sweating in that part for some hours, and may be resorted to when there is a special object in temporarily arresting the sweaty secretion—*e. g.* in the axillæ of ladies before going to a ball—especially when the odor is offensive.

### Bromidrosis.

Sweat may become offensive after or before secretion. When symptomatic, as in scurvy, syphilis, rheumatic fever, uræmia, etc., it does not call for separate treatment; it is only when idiopathic—*i. e.* when the malodor is the chief, if not the only, symptom—that treatment is demanded, and that, too, only when the condition is acquired. It may be general or local. The local form is by far the most common, the feet being especially frequently affected, but the axillæ, groins, and perinæum are sometimes the source of the trouble.

Bromidrosis of the feet is always associated with hyperidrosis, and the foul odor is acquired after the sweat is poured out. This odor, which is most repulsive and has been compared to putrid cheese, is due to the development of the *Bacterium fœtidum* in the sweat. A drop of sweat stained with methyl violet and placed under the microscope shows myriads of micrococci.

The treatment must be directed to checking the hyperidrosis, and to local disinfection to prevent the development of bacteria. The number of remedies recommended is legion, but the following plan in the hands of the author has been invariably successful: Sulphur, either sublimed or precipitated, is given internally, a level tea-spoonful in milk, twice a day, or if it purges too much one-half that quantity, or it may be combined with astringents, as in the following formula:

℞. Pulv. sulphuris præcip., ʒij;
Pulv. cretæ comp., ʒvj;
Pulv. cumini comp., ʒij.
Sig. A level tea-spoonful in water or milk, to be taken night and morning.

If the sulphur is well tolerated, this alone is sufficient as a rule: the quantity of sweat is diminished, probably through the sulphur being in part excreted by the sweat. Local antiseptics are, however, of service, and Thin's plan of shaking finely-powdered boric acid into the socks and stockings, which of course should be changed at least once a day, is a useful adjunct. Ablutions twice a day should also be insisted on, and, as it occurs chiefly in domestic servants and others who are on their feet a great deal, the admonition is not unnecessary. In the German army a lubrication of the feet with 2 per cent. of salicylic acid in mutton suet was universally adopted. More recently a 10 per cent. solution of chromic acid has been painted on until the epithelium is hardened, and when this is thrown off improvement is generally manifest. Numerous other plans have been recommended, such as strapping the feet with emplastrum plumbi or emplastrum saponis. Lead, zinc, and carbolic lotions and other antiseptics have been recommended, and are no doubt more or less beneficial, but personally I find that the sulphur internally and boric acid shaken into the socks fulfil all requirements.

Sometimes patients seek advice for bromidrosis of the axillæ or groins. Here the cause is probably in the sweat-secretion. The sulphur treatment is useful also, and locally the parts may be bathed with a lotion of borax 2 drachms to 8 ounces of water, or "sanitary rose powder," which contains boric acid, may be dusted on. (See also under Hyperidrosis.)

## Miliaria.

*Synonyms.*—Miliaria rubra; Lichen tropicus; Prickly heat; Sudamina; Miliaria crystallina.

Sudamina do not require treatment. There are two other chief forms of miliaria—miliaria rubra or vesiculosa and miliaria papulosa.

Miliaria rubra may occur, like sudamina, at the termination of a specific fever or from chills during sweating or from over-stimulation of the skin, as in infants kept too warmly clothed, especially when there is excessive sweating, as in rickety infants. The eruption consists of conical discrete vesicles or pustules on a red base, either scattered or crowded. The red gum of infants is really a form of miliaria.

The treatment, if any is required, should be directed to the avoidance of great changes of temperature. The patient should be more lightly clothed, and saline aperients or saline diuretics administered, especially the acetate or nitrate of potassium. In rickety children iron, cod-liver oil, cold sponging, abundance of milk, and fresh air are required. In infants excessive sweating in hot clothing should be avoided.

Locally, the same treatment is indicated as that to be mentioned for lichen tropicus, the well-known prickly heat so common in hot climates, but occasionally seen in the summer in temperate regions. The lesions of lichen tropicus consist of minute bright-red, acuminate, discrete papules, crowded together, with vesicles or vesico-pustules scattered among them. They come out suddenly, associated with hyperidrosis in other parts, with intense pricking and tingling. The disease affects covered parts, involving large areas, and may appear anywhere.

The treatment should be rest, light clothing, a bland diet, with the avoidance of alcohol and the use of saline aperients or diuretics, as in the other form of miliaria.

Locally, a calamine lotion is useful:

| | | |
|---|---|---|
| ℞. | Calamin., | ʒij; |
| | Zinci oxid., | ʒss; |
| | Glycerini, | ♏xv; |
| | Aquæ rosæ, | ℥j.—M. |
| | Ft. solutio. | |
| Sig. | To be painted on and allowed to dry. | |

Other applications are a weak subacetate of lead lotion, 10 minims to the ounce of distilled or chloroform water; and liquor carbonis detergens, 1 drachm to aq. sambuci, 8 ounces, sponged freely on. Alkaline baths, 2 ounces of bicarbonate of sodium or of borax to a 30-gallon bath at a temperature of 95° F., may be given in severe cases. Some prefer dusting powders, such as zinc oxidi and starch in equal parts, or boric acid 1 part, cimolite 7 parts. To prevent future attacks woollen clothing should be worn and rapid changes of temperature avoided.

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## NEW GROWTHS.

### Xanthoma.

*Synonyms.*—Xanthelasma; Vitiligoidea.

Xanthoma occurs in the form of plaques imbedded in the skin, or as nodules from a pin's head to a bean in size, rarely larger. The color is yellow, usually the tint of chamois leather. The plaques are slightly raised above the surface, but are scarcely perceptible to the touch when pinched. They are not uncommon in the form of plates imbedded in the eyelids, especially in people past middle age who have been subject to migraine. Subjects of chronic jaundice from any

cause are liable to a more general formation of the lesions in the form of nodules on the extensor aspects and lines in the palms and soles. In rare instances of the disease jaundice is absent in adults, and in children the affection is not infrequent without jaundice.

Neither internal nor external medication has any effect, and treatment is only sought when the affection involves the eyelids. Then a careful excision in the direction of the folds should be made with antiseptic precautions. The whole tissue in which the xanthoma is imbedded should be excised, and fine sutures employed to bring the edges of the wound exactly together, after which collodion should be painted on. Healing should take place by first intention, and the skin is so lax that the scar is scarcely perceptible. Care must be employed when near the inner canthus to avoid ectropion.

A similar, very rare, condition sometimes occurs in diabetics; in it there is rather more evidence of inflammatory changes. If the diabetes mellitus is successfully treated, the lesions disappear after a time, but involution of ordinary xanthoma is extremely rare.

## Lupus Vulgaris.

*Synonyms.*—Lupus exedens; *Fr.*, Lupus tuberculeux; *Ger.*, Fressende Flecte.

Lupus vulgaris is a granulative new growth infiltrating the skin, due, it is generally considered, to the irritating influence of the tubercle bacillus. It begins in small nodules deep in the skin, of reddish-brown color, and, as it comes nearer the surface and projects beyond it, it is semitranslucent, and has been aptly compared to apple jelly. It enlarges peripherally, and, coalescing with other nodules, an irregularly outlined patch is formed, with a constant tendency to enlarge both by peripheral spreading and also by the coalescence of new nodules, which are always liable to form just beyond the main patch, presumably because of invasion of the lymphatics by the bacilli. The disease in the great majority of cases begins in childhood and on the face, but no part is absolutely exempt except the scalp. There are generally only one or a few patches, and the disease is not symmetrical, unless it begins on the nose and spreads each way. The new tissue may undergo involution in the centre while spreading peripherally, or it may ulcerate spontaneously if near a mucous membrane or if in a notably strumous patient, or as a result of slight local irritation, exposure to cold, etc. In a large number of patients no notable defect in the general health can be detected, though they very frequently come of phthisical ancestors. In other cases, again, the disease is associated with what we are accustomed to call strumous phenomena, enlarged glands, chronic suppurative dermatitis, diseased bone, etc. Lupus itself, though it destroys the soft tissues, does not attack bone. As

a rule, the disease progresses very slowly and is very difficult to eradicate.

Internal treatment and hygiene have only a very moderate influence on the disease, and that an indirect one. With the frequent family predisposition to phthisis (though lupus patients themselves are seldom phthisical), and especially where there are strumous manifestations, cod-liver oil in full doses, continued with intermissions for long periods, is indicated in a large proportion of cases. Iodine, either as iodide of potassium or dissolved in cod-liver oil, in 1-grain doses may be given. Liveing is a strong advocate of the tincture, given as follows:

℞. Tinct. iodi, ℥iij–v;
Liq. potass. arsenit., ℥j–ij.—M.
Sig. To be taken three times a day after food in a wine-glass of water.

The main point to aim at is improved assimilation; hence attention to the digestive organs is necessary, and a nutritious, easily-digested diet is required. When the patient is in good health, as is not infrequently the case, internal treatment is of small importance, except perhaps to satisfy the minds of the friends, who generally consider that the blood wants "purifying." It was fondly hoped that a specific had been discovered in Koch's tuberculin hypodermically administered. This hope, however, has not been realized, but, while many reject it altogether in their disappointment, and regard it as both dangerous and useless, in the author's opinion it still has a place in the therapeutics of lupus, although a small and subsidiary one—viz. after removing as much of the diseased tissue as can be done from without, injections of tuberculin, continued until the lupus is healed, remove some disease that could not otherwise be reached, and so make the result more durable than it would be without the tuberculin. As patients vary greatly in their susceptibility to the fluid, 0.2 gm. of a 1 per cent. solution should be the first or trial dose, though it may be increased in proportion to the patient's tolerance up to a cubic centimetre or more of the 1 per cent. solution. The general effect of the first injection is to produce a rise of temperature of from 2° to 5° Fahr., or even more, within six hours, followed by a gradual decline to or below the normal. In subsequent injections the rise and fall are more sudden than at first; nausea, vomiting, general aching or flying pains accompany the fever. Locally, the effect is to produce great swelling and redness in and around the diseased area, with a copious exudation of serum from the wound. The general and local symptoms diminish as tolerance of the fluid becomes established,

until even very large doses do not produce any visible effect. The injections should not be given oftener than every other day at first, but subsequently they may be given daily.

In addition to the removal of lupus tissue by tuberculin, the chronic lymphatic œdema often seen when lupus attacks the lip or other lax tissue may be notably diminished. Injections in the direction of the lymph-flow near the seat of disease cause reaction when injections into the back are no longer followed by reaction. Tuberculin is of most service in the strumous form of lupus, and least in the purely nodular or non-ulcerative kind. It will be seen that, after all, most reliance must be placed on local measures for the removal of the diseased tissue, and these may be divided into two classes: 1. Those which protect the part from irritation or diminish the hyperæmia, and so favor involution; and 2. Those which destroy the lupus tissue.

The first class are of only limited application, but pave the way for more radical measures, for which the patient is not always at once prepared. Calamine lotion is useful in this way: it diminishes hyperæmia, and partially conceals the disease. Strong lead and other astringent applications are also useful, and emplastrum Vigo or other forms of mercurial plaster may be applied at night, and some degree of involution produced. Of course, if there is ulceration, antiseptic ointments, such as 10 grains of iodoform to 1 ounce of boric-acid ointment, would be indicated, or iodide-of-starch paste may be applied on parts covered by clothing.

Class 2 may be divided into chemical and mechanical destroyers of tissue. The older caustics were Hebra's and Cosme's arsenical paste—viz. arsenious acid 10 grains; artificial cinnabar ½ drachm; ointment of rose-water ½ ounce; or the arsenious acid and cinnabar were used as a powder with white sugar. The paste is spread on linen, and applied closely by means of a pad and bandage or strapping for twenty-four hours, when, after cleansing, it may be renewed once or more. It destroys the diseased tissue, leaving the healthy part to help heal the wound, but it is horribly painful after the first application, and must be limited to three or four square inches, to avoid the danger of the absorption of arsenic. This is given as an example of the older method of caustics. Another caustic is Vienna paste, consisting of caustic potash and unslaked lime equal parts, rubbed together with a little alcohol just before use. The surrounding skin is protected with plaster, and the paste washed off with vinegar and water in a few minutes. It should only be used for small areas on the trunk and limbs. Another caustic is the chloride-of-zinc paste: zinc chloride 4 drachms; liquor opii sedat. (Bathey) 4 drachms; starch 1½ drachms; water 1 drachm. It should be applied on lint to the area of disease for twenty-six hours. It is painful for about six

hours, but neither this nor Vienna paste selects the diseased tissue as arsenic does. The solid stick of nitrate of silver bored freely into the diseased tissue is very effectual, and is followed by rapid healing, but there is often severe pain for several hours after the operation, for which anæsthesia would be employed if the area were not small. This method is still considered the best by Kaposi of Vienna.

These caustics have, however, been superseded to a great extent by salicylic acid, which may be applied as a paste—the acid being mixed with enough glycerin to form a paste and spread on lint; or it may be put on in the form of Unna's plaster, with or without creasote—Unna thinks the creasote diminishes the pain. It does not produce the deep caustic effect of the stronger pastes, but may be applied again and again until the disease has been destroyed. Fresh plaster has to be put on once or twice a day, and the part dried with absorbent wool. The more closely it can be applied, the better, and where practicable it should be fastened on with a pad. Besnier applies pyrogallic acid, brushing on a saturated solution in ether; then covers it with traumaticin: it excites a suppurative dermatitis, and often the procedure has to be repeated many times. Schwimmer uses a 10 per cent. ointment, and then on the raw surface applies emplastrum hydrargyri. Lactic acid, which lacks elective power, camphor-napthol, and hydro-naphthol also have advocates.

Of all these methods the author prefers salicylic acid either as paste, plaster, or with a 10 per cent. collodion solution, while Brocq thinks a combination of pyrogallic acid and salicylic acid in a 10 per cent. collodion gives the best results. These methods may be employed when the patient cannot or will not be operated on; they are not to be compared to surgical methods, either in rapidity, efficacy, or painlessness, if an anæsthetic is given for the operation itself. The surgical methods employed are scraping by the curette or sharp spoon, as first suggested by Volkmann, linear scarification, and the actual cautery, either galvanic or Pacquelin.

Scraping with the curette or spoon is a simple and effectual procedure. All the diseased tissue which can be got at is freely scraped away, until the healthy, more resistant tissue is reached; a very little practice enables the operator to determine when he is working in diseased or healthy tissue. It is surprising how little pain is experienced by the patient on recovering from the anæsthetic after the freest scraping, and the wound heals rapidly with mild antiseptics, such as boric acid or iodoform ointment. If this scraping alone be employed, however thoroughly the diseased tissue seems to have been removed at the time of the operation, more or less recurrence pretty surely and quickly follows. The author has therefore, after scraping freely, swabbed the part with strong sulphuric acid applied with a

piece of wood—*e. g.* a bundle of match-ends. After a few seconds this is neutralized with bicarbonate of sodium, and the part is then washed, or the strongest carbolic acid may be used, which requires no neutralizing. Since using these liquid caustics longer immunity from recurrence has been obtained, while still further removal of inaccessible disease may be accomplished by the injection of tuberculin, as already described, until the wound is quite healed. It has been objected that a large cicatrix is more likely to ensue, but with practice and care this may be avoided in most cases, though keloidal scars do sometimes result from this as from every other mode of procedure.

Linear scarification is effected by a sheaf of lancets in a handle, so that parallel incisions are made, as in Squire's instrument, which has a guard to prevent the cut being made more than one-sixteenth of an inch deep, or in Veiel's scarifier or Pick's modification of it, which has the advantage that all five blades can be used or as many taken away as desired when only small spots remain. Squire's instrument is useful for large surfaces, but cannot easily be used in angles, such as the orbit. Vidal uses only a single lancet with obtuse triangular end. These instruments can be used with local anæsthesia, and the incisions should be crossed and recrossed, so as to mince up the tissue as thoroughly as possible; and it is claimed that the scar resulting is smoother and thinner. The author, however, only partially approves of this, and the operation has to be repeated very many times to obtain the result of one or two operations with the curette, so that, except for very superficial layers, curetting is in his opinion more thorough and speedy, and, when combined with liquid caustics, more permanent.

Linear scarification is useful, however, in rapidly-spreading lupus, the so-called lupus vorax, the incisions being made at the border pretty deeply for small areas or isolated nodules. After each operation the part may be dressed with 1 : 1000 or 1 : 1500 corrosive sublimate solution, and in a day or two resin plaster should be applied. The operation has to be repeated every ten or sixteen days. The number of operations is often very great, and the results by no means always successful, though when they are it is claimed that the scar is better than by any other method. Besnier, however, is of opinion that all operations involving bleeding are more liable to produce general bacillary infection, especially after scarification where the mincing is so often repeated. This is not admitted by his colleagues, Vidal, Brocq, and others; but Besnier is positive that he has seen such results, and therefore is an advocate of linear scarification by means of the galvano-cautery, with platinum blades at a dull-red heat. He prefers this to the Pacquelin cautery, which is often used, and which is more obtainable and portable than the battery. The galvano-cautery is more manageable, however, but it is not so easy to discriminate between the

lupus and the healthy tissue, though Besnier asserts that this can be done. It is certainly efficacious when skilfully applied, but great care is necessary to avoid seamed scars. It is certainly the best for lupus of the mucous membranes, and is useful in old lupus for the destruction of the small nodules which are imbedded in the cicatricial tissue ready to start into activity. These are often very troublesome to deal with. They have been attacked by special instruments, such as Morris's screw or Fox's dental burr. The author generally bores them out with a match dipped in acid nitrate of mercury, unless the battery is at hand. Electrolysis may also be used for the nodules, and Jackson and others have recommended it for larger areas, but in the author's opinion it should be reserved for quite small patches.

To sum up: in the author's opinion free curetting, followed by swabbing with strong carbolic acid, with or without hypodermic injections of tuberculin until the wound has healed, is the plan most rapidly efficacious and generally applicable; but if the lupus is superficial, of small area, and expense no object, linear scarification may be adopted. If the disease affects the mucous membranes, or is in nodules in cicatricial tissue, the galvano- or Pacquelin's cautery finds a place, the galvano-cautery being preferable. Finally, if anything in the shape of an operation is refused by the patient—and it is rarely wise to press it at first—palliating applications, soon replaced by elective caustics, such as arsenic or, preferably, salicylic acid, with or without pyrogallic acid, may be confidently recommended. No one method is therefore universally applicable, and much must depend on the skill and acumen of the practitioner and the position and condition of the lupus on the one hand, and the constitution and temperament of the patient on the other, as to which is the best means to employ in any individual case.

### Lupus Erythematosus.

*Syn.*—Seborrhœa congestiva; Lupus sebaceus.

Lupus erythematosus is not, like lupus vulgaris, due to the tubercle bacillus, and resembles an inflammation rather than a neoplasm. It occurs, as a rule, in multiple patches, with a tendency to symmetrical arrangement, chiefly about the face and head, where the circulation is feeblest, occasionally on the extremities, and rarely on the trunk. Hence it is seen, for the most part, on the malar prominences, the nose and ears, almost any part of the scalp, and on the fingers. In exceptional cases it is diffuse, and spreads more or less rapidly over the greater part of the trunk, endangering the life of the patient.

In the circumscribed form the patches are sharply defined at the border, flat, very slightly raised, with a tendency to the formation of crusts, although this is not a marked feature in the early stage. The color is a bright red, unless obscured by scales, and there are no

nodules. On the nose, in the early stage, the seat of the disease is obviously at the sebaceous orifices, which are plugged by horny epithelium, which can be picked out, showing the dilated orifice. In this stage the patch at the end of the nose is of a dirty yellow color, with a red border. The disease tends to spread peripherally, and new patches may form in the neighborhood of the old. Involution may take place either spontaneously or as the result of treatment, progressing from the centre toward the periphery, but often stopping there; the border being then raised more distinctly by contrast with the depressed centre, which is atrophically cicatricial, ulceration only occurring as the result of irritating and injudicious treatment.

No definite cause can be assigned for the disease, but feeble circulation, especially when associated with chilblains and certain other kinds of dermatitis, such as erysipelas, seborrhœa, scarlatina, etc., is a favoring condition. Indications, therefore, for internal treatment must be sought for in any departure from health that can be detected. Uterine irritation has sometimes seemed to aggravate this disease, as it will nearly any inflammatory eruption on the face. Internal direct treatment is, as a rule, of little avail: arsenic in the form of 5-minim doses and more has apparently cured one or two cases, and iodide of starch paste, a heaped tea-spoonful three times a day, is said to ameliorate and sometimes cure the disease (McCall Anderson). Ichthyol in 5-minim doses, made into pills with liquorice powder, and taken three times a day, is sometimes successful, at all events, in diminishing the hyperæmia. Besnier claims occasional good results for iodoform given internally in 3-grain doses. Whilst one or all, in turn, of these drugs may be tried, for the disease is very slow and obstinate, with a strong tendency to recurrence, the chief reliance must be placed on local treatment.

The indications are here threefold: first, to reduce hyperæmia when, especially in recent cases, that is a marked feature; secondly, to remove the surface layers of unhealthy epithelial crusts, which are always impregnated with micro-organisms from the atmosphere, and aggravate the condition; thirdly, to favor the involution of the round-cell infiltration of the cutis, or to produce its complete removal by mechanical or chemical means with the least possible disfigurement.

In a mild case it is often judicious to commence with soothing and protective measures. Calamine lotion, with $\frac{1}{4}$ grain of bichloride of mercury to the ounce, painted on several times a day, or a strong or diluted solution of acetate of lead, may be used. Mild astringent or antiseptic ointments, such as boric acid $\frac{1}{2}$ drachm, ointment of oxide of zinc 1 ounce, may be applied constantly, or weak mercurial ointments—*e. g.* ammoniated or a weak nitrate-of-mercury ointment—may be rubbed in

night and morning. In most instances mercurial plaster on linen may be applied at night. A very good application is ordinary collodion painted on daily for a week, then allowed to peel off and renewed. It acts mechanically, compressing the part and squeezing the blood out, and thus favoring atrophy. If the hyperæmia is only moderate, Duhring's lotion of sulphide of zinc may be tried, and sometimes acts well. It is prepared as follows: 30 grains of sulphate of zinc and 30 of sulphuret of potassium should be dissolved separately in rose-water, then mixed; alcohol 3 drachms is then added, and enough rose-water to make 4 ounces of lotion. It should be painted on three or four times a day.

To remove scales Hutchinson's treatment of rubbing the part with lint dipped in benzotine every night, and then applying a weak (4 grains to the ounce) yellow-oxide-of-mercury ointment, or, what I prefer, the calamine lotion described above, applied three or four times a day, is an excellent plan where there is only moderate hyperæmia. In a few cases it may be wise to use the benzotine only two or three times a week. In more indolent cases, Hebra's soap treatment is good. The spiritus saponatus kalinus is rubbed on firmly with a piece of wet flannel, which removes the scales and fatty plugs. There may be some oozing of blood and serum, which dries in crusts. A mild antiseptic ointment—iodoform 5 grains, oxide of zinc ointment 1 ounce—may be applied at once. When the surface is sound the process may be repeated. Oil of cade, 1 or 2 drachms to the ounce of ointment, is sometimes a useful addition. This should only be applied to an indolent patch, and it is best to try it on a small surface first. Milder soap treatment may be employed in the moderately hyperæmic cases, such as 10 per cent. ichthyol or naphthol soap, or some of the numerous antiseptic soaps of Eichhoff and Unna, such as those containing salicylic acid and resorcin. In all cases care should be exercised not to overdo it, as if unduly irritated the disease will certainly spread. It is often best, therefore, to alternate these stimulating applications with soothing measures.

Brocq recommends the application of a pomade composed as follows:

| | | |
|---|---|---|
| ℞. | Acidi salicyl., | ʒss; |
| | Acidi lactic., | ʒss; |
| | Resorcini, | gr. xlv; |
| | Zinci oxid., | ʒij; |
| | Vaselini pur., | ʒxvij.—M. |

The same author also states that the following preparation is well borne as a rule:

℞. Acidi salicyl., ʒj ;
Acidi pyrogall., ʒij ;
Vaselini pur., ʒxx.—M.

This ointment is applied during the night. During the day it can be substituted by the resorcin pomade, the formula for which is given on the preceding page.

Strong caustics, such as arsenical paste, described under Lupus vulgaris, are sometimes used. If the area is quite small, the author applies with firm pressure a match dipped in strong acid nitrate of mercury. Payne's treatment (salicylic acid ½ drachm, collodion 1 ounce, painted on daily) acts as a mild escharotic, and is often of great value. Resorcin in collodion, 20 grains to the ounce, may be also employed, but resorcin thus combined acts as a caustic which requires great care in the handling. In chronic or long-standing cases repeated scarification, as described under Lupus vulgaris, is most valuable, and is, in the author's opinion, far more suited to this form of lupus than to that of lupus vulgaris. After the scarification, iodoform should be thoroughly rubbed into the incisions with a piece of lint. The author finds much more rapid improvement with this combined procedure than with scarification alone. Scarification with the galvano-cautery may also be employed, but with great care, as a thickened scar in lupus erythematosus is quite unjustifiable, while in lupus vulgaris it is sometimes unavoidable. By the judicious use of one or a combination of these methods improvement can always be effected, and a cure with a thin smooth cicatrix sometimes obtained; but no definite promise of a permanent cure can be made, as recurrence too often ensues just when a successful result appears to be within one's grasp.

## Scrofuloderma.

This term includes various forms of chronic suppurative dermatitis which are found in strumous patients, who almost invariably present other lesions, included under struma, of bone, joint, mucous membranes, and glands. As a rule, the skin over a caseating and suppurating gland, most commonly in the neck, is the starting-point. It becomes red, flabby, undermined by pus, and pierced by sinuses communicating with the gland below. The affected skin breaks down, and an ulcer is formed which slowly spreads over the face or neck. Or the first lesion may be a strumous nodule very much like a gumma, which enlarges to the size of a nut, softens, and either suppurates or disappears. If it suppurates, the skin is implicated, just as over a gland, and an ulcer may result. This ulcer may have thin, red, undermined edges, with irregular base and flabby pus-covered granulations, or it may be an indolent flat ulcer with sharply-cut edges, spreading slowly,

but seldom healing spontaneously. Or there may be fungating growths with or without papillary hypertrophy. These are commonest on the hands or feet, and often associated with diseased bones or joints.

The strumous constitution of the patient suggests that cod-liver oil in full doses, preparations of iron, especially the iodide, and improved hygiene should hold a prominent therapeutical place. Prolonged residence by the sea, choosing those places where the air is most bracing, is almost invariably beneficial, and the diet should be generous but easily assimilated. Locally, unhealthy granulations should be scraped away with a curette and the part swabbed with strong carbolic acid. Sinuses should be laid open, undermined skin snipped away, and the ulcers dressed with iodoform, followed by black wash applied on lint and covered with oiled silk. Iodide-of-starch paste is often a convenient as well as an antiseptic dressing. It should be spread on the sore and covered with lint.

Where operative treatment is refused a paste made by adding salicylic acid to glycerin until of convenient consistence is often a good substitute, but the healing is much slower and there is more pain in the long run than with surgical procedures.

Chaulmoogra oil given in capsules or in emulsion of mucilage of acacia or tragacanth is sometimes valuable, the dose at first being 3 to 5 minims after meals, increased gradually to 15 or even 30 minims if the stomach will bear it. It may also be applied to the sores in the form of a 20 per cent. ointment.

## Keloid.

*Synonym.*—Cheloid; Alibert's keloid.

"Keloid" is applied both to overgrowths of scar-tissue and also to fibrous outgrowths of the skin of a similar character, apparently spontaneous in their origin, though many of them are traceable to comparatively trifling lesions of the skin. A constitutional idiosyncrasy is no doubt present, but no means of modifying or in any way influencing such a peculiarity is known.

The local treatment is also unsatisfactory: in whatever way removed, recurrence, even larger than before, is the rule. Spontaneous involution occurs sometimes, and pressure favors this, Verneuil having cured some cases with the elastic bandage. Excision is worse than useless in most cases; if done at all, it should be only for small growths, where the excision could be free enough to remove the vessels, which are always diseased beyond the visible growth. Brocq and Hardaway have had good results in a few cases with electrolysis, and Vidal has succeeded in removing keloids by frequently-repeated crossed scarifications, these methods evidently acting by producing occlusion of the vessels. This scarification is useful also in favorably modifying a scar

which seems to be forming with exuberance of tissue. Morphine injections or belladonna applications externally are sometimes required, but pain is exceptional.

## Fibroma.

*Syn.*—Molluscum fibrosum, Molluscum pendulum.

Soft tumors, consisting of lax fibrous or of gelatinous tissue on its way to become fibrous, form in the skin, occasionally as a result of a congenital tendency. They usually begin in early life, but tend to increase in number and size indefinitely. They are often associated with deficient mental development. Small single tumors of similar anatomical constitution are often seen in elderly people. The tumors may be of any dimension, from a pin's head to an orange, but the majority are of less size than a walnut. They may be sessile or more or less pedunculated. The last may be removed by ligature or écraseur or galvanic cautery. Others, which from their position are inconvenient or too unsightly, may be excised, but they are apt to recur if the excision is not complete. As they may amount to hundreds, or even thousands, it is obvious that it would only be practicable to deal with a few which are in awkward positions.

## Nævus Vascularis.

Nævi may be capillary or cutaneous and venous or subcutaneous, though in the latter the skin may also be involved.

The capillary nævi may be of any size, from a mere point up to large areas involving a whole limb or one-half of the body. They may be on a level with the skin or raised more or less above it, of a bright-red color or of a more or less purplish hue. The venous nævus is generally more raised than the capillary; it is convex, smooth, or tabulated, and of a dark-purple color, compressible, but rapidly filling after compression.

If capillary nævi are small, superficial, and in a young infant, and do not appear to increase in size, they may be left untreated for a time, as they often undergo spontaneous involution. Painting with collodion or strong liquor plumbi subacetatis facilitates this. When over a bony part mechanical compression may be used. The treatment of large port-wine marks is very unsatisfactory. Multiple scarification or puncture has been recommended, but on slender grounds. The author has produced considerable improvement by means of electrolysis, a needle attached to the negative pole being pushed horizontally under the skin in parallel lines rather close together, and a current of three or four milliampères used.

The methods for removing nævi may be classified into—1. Those which produce plugging within the vessels by exciting inflammation

or by electrolysis; 2. Destruction by caustic or cautery; 3. Removal by knife or ligature.

When the nævus projects above the surface and is of small size, now that by the modern antiseptic and bloodless system of operation primary union can be made almost a certainty, excision gives the best result, as, if the skin is lax enough, a simple linear scar results. If the position is unfavorable or the nævus too large, ligature may be employed, the various methods of effecting it being described in surgical works.

Caustics are not to be recommended, as they are both uncertain in their action and leave ugly scars. Cautery by Pacquelin's or the galvano-cautery may be employed for large flat surfaces in concealed positions, while on the face or other position, where the kind of scar is of importance and the nævus is not suitable for excision, inflammation may be produced or electrolysis employed. One method of exciting inflammation is by vaccination, of course with the proviso that the child has not been previously vaccinated. The nævus must be of only moderate size, and several punctures made carefully, so that the lymph is not washed out by the blood-flow. The disadvantage is, that if the nævus is not completely destroyed the vaccination cannot be successfully repeated. Another plan is to pass fine silk threads through the tumor in various directions until some inflammation has been excited; but this is not a very good plan.

Injections of chloride of iron, chloride of zinc, or tannin are effectual, but not free from danger, as the coagula may be carried to the heart. If done at all, a ligature should be applied to the tumor for a few minutes before and after the injection, and a firmer clot thus secured, which would not be able to escape into the circulation. Electrolysis is, however, preferable to all other coagulation methods. The positive pole is a flat disc of flexible metal covered with chamois leather and wetted with brine, and then bandaged on the arm or any other convenient place. The needle, attached to the negative pole, is introduced into the nævus and made to traverse the growth in all directions, a current of five milliampères being sufficient. The punctures should be rather close together, as the vessels are so numerous that otherwise some of them may escape occlusion. It is only suited for nævi of moderate size. Where it is desired to produce ulceration of the mass, stronger currents should be employed and the needle should be larger. An ordinary surgical needle, curved on the flat, is a suitable form: it should be introduced along the base of the nævus, and be pushed across to the opposite side. Of course anæsthesia is necessary for these methods.

There are still some who prefer caustics for superficial nævi of moderate size. They may be thus treated by firmly pressing on the part the

end of a piece of wood dipped in nitric acid or the acid nitrate of mercury; or ethylate of sodium, as recommended by B. W. Richardson, may be painted on. The ethylate should be freshly made, and care taken to keep the part dry; the crust must be allowed to separate spontaneously. It is a good plan to cover it with alembroth wool and paint over it collodion, and by exclusion of air diminish the chance of suppuration. In the author's opinion, these methods are inferior to electrolysis, and more likely to produce conspicuous scars.

### Telangiectasis.

This term is applied to dilated capillary tufts of a nævoid character which are common on the face at all ages. They are especially frequent on the nose as little bright-red vascular stars, with a rather more prominent central vessel. The term is also applied to any small dilated vessels, such as those seen on the noses of dyspeptic persons who suffer from acne rosacea, when associated with exposure to vicissitudes of the weather. These vessels may be effectually occluded by electrolysis, as described under Nævus vascularis. It is not, however, necessary to use a current of more than two or three milliampères, the needle at the negative pole being kept in until the skin where the vascular tuft is situated becomes whitened by the bubbles of gas liberated by the current, filling the small dilated vessels and driving out the blood. It should be the aim of the operator to introduce the needle-point into the lumen of the vessel. When the patient is old enough to co-operate, the most convenient positive pole is a carbon cylinder covered with leather and wetted with salt water. This the patient grasps after the needle is introduced, and thus avoids the sudden prick, which naturally causes him to start if the circuit is complete when the needle is inserted.

### Epithelioma.

*Syn.—Fr.* Epithelioma, Cancroïde; *Ger.* Epithelialkrebs.

This is essentially cancer of the skin and mucous membranes. There are three clinical varieties—the discoid and the papillary, which are superficial, while the third is deep-seated and infiltrating. The superficial forms tend to become deep as time goes on.

The discoid form may begin with scaly papules, which coalesce into a superficial hard disc with irregular surface and sharply-defined border. At first it is movable in the skin, but later becomes adherent below, and after months or years ulcerates. In other cases no papules may be seen: simply a fissure forms, from which oozes a thin fluid which dries into a greenish or blackish crust. The papillary form begins chiefly on mucous membranes, often originating from a mole, wart, or other simple papilloma. Induration occurs, papillomatous growth develops rapidly, and, although ulceration is present, the fungating

growth predominates. For a long time both these forms may remain superficial, and only spread laterally; but when they have penetrated below the corium the invasion of the deeper tissue proceeds rapidly through fat, fascia, muscles, and bones. The lymphatic glands become involved, and then generalization, including the viscera, soon ensues. Dull aching, lancinating, and other pains increase as the disease progresses.

In the deep-seated form these superficial stages do not occur, and the tongue, submucous substance, or subcutaneous layers are the first parts invaded, and the whole course is more malignant. Fifty per cent. of ordinary epitheliomata begin on the lower lip.

Speedy and complete removal of the growth is imperative as soon as the disease is recognized. When the glands are implicated, treatment is resolved into palliative measures only. Either the knife, caustics, the galvano-cautery, écraseur, or actual cautery can be used, according to the condition of the surrounding tissues and the depth of the cancer. Whatever is done, should be thorough, going well into apparently healthy tissue, as only in this way can a real cure be hoped for. Caustics are only suitable for the superficial form. The solid potassa fusa has been bored in and around the diseased area, any excess being neutralized with dilute acetic acid. Arsenical paste, as described under Lupus vulgaris, has also proved successful. Brocq prefers Unna's formula—namely, arsenious acid, 2 parts; sulphate of mercury, 6 parts; calcined sponge, 12 parts. It is made into soft paste with water, and is applied to the raw surface after removing the crusts and painting the surface with ammonia. The paste is covered with amadou or wadding, and left until the whole growth and the paste come away together spontaneously, which takes from eight days to three weeks. Vidal scrapes the epithelioma thoroughly, and then powders the surface with chlorate of potassium, renewing it night and morning, and this again is covered with lint dipped in a saturated solution of the same substance and covered with oiled silk.

These chlorate-of-potassium applications are very painful. Brocq claims for aristol equally good results without the pain. Kaposi thinks highly of pyrogallic acid, 2 ounces to lard 1 ounce, constantly applied. A 33 per cent. resorcin ointment has also been advocated. Anything like sufficient destruction by caustic is dangerously injurious, and wherever the position admits of it the knife is by far the most reliable. On the lip a linear cicatrix can be obtained by its use if the amount removed is not too great. For the tongue the galvano-cautery écraseur finds a suitable employment, and also in other parts inaccessible to the knife. These methods are discussed in detail in surgical works.

## Paget's Disease of the Nipple.

This is a disease of the breast in women, which generally begins after the climacteric, and at first looks like a superficial weeping excoriation. It resembles eczema, but is more sharply defined at the border, and becomes a raw surface with evident loss of substance of the whole cutis. Later, induration sets in, so that it resembles "a penny felt through a cloth." Unlike eczema, itching in this disease is a late symptom. After a time the nipple becomes retracted, and unmistakable signs of cancer are then discoverable. Shooting and other pains begin to appear, the whole breast is hard and lumpy, and a little later the neighboring glands become enlarged.

As cancerous development in the future is inevitable, though it may be delayed for years, the only course is thorough excision well beyond the diseased area as soon as the nature of the condition is recognized. The diagnosis, however, is not always possible at an early stage, but if there is evident loss of substance, one may be sure that it is no ordinary eczema, and it is neither necessary nor wise to wait for induration before operating. Palliative measures only waste valuable time, and any stronger measures short of complete destruction simply hasten the development of the cancer.

## Rodent Ulcer.

*Syn.*—Jacob's ulcer; *Fr.* Ulcère rongeaud; *Ger.* Der flache Krebs.

Rodent ulcer is probably only a clinical variety of epithelioma. It occurs usually in some part of the face in persons past middle life. It often starts from a wart or mole, or from an ordinary pimple or excoriation which has been irritated for some time. It may appear at first as a soft, vascular brownish-red nodule, commonly on the nose or cheek, which after some time breaks down into an ulcer with raised rolled edge and an irregular base. It spreads slowly but surely, but with intervals of quiescence. Healing, either spontaneously or by treatment, is only temporary, and it breaks down and forms a larger sore than before. It may remain superficial, or go deep and destroy everything, not excluding the bones; but the neighboring glands are not involved, unless it assumes an exuberant epitheliomatous growth, forming the crateriform ulcer of Hutchinson.

Free and wide excision is the safest and most effectual treatment, but sometimes the patient refuses radical treatment of this kind, and then iodoform or other antiseptic and soothing application—*e. g.* boric-acid ointment—may be used. Saturated solutions of chlorate of potassium have appeared to promote the healing of some cases. Ten per cent., or even stronger, resorcin ointments have also been recommended, but, though these may be employed as substitutes for the radical operation, they are not reliable, and irritating applications which do not destroy

the disease are sure to make it spread faster. In some positions and in some ulcers free erasion with the sharp spoon may be done, followed by strong solutions of zinc chloride freely applied. Arsenical or other powerful caustics, and Pacquelin's or the galvanic cautery, may take the place of excision by the knife. For the crateriform ulcer early and free excision should be promptly resorted to.

# INFLAMMATIONS OF THE SKIN.

By W. A. HARDAWAY, M. D.

## Erythema.

Erythema, or erythema simplex, is a redness of the skin which may be made to disappear temporarily by pressure. It appears as diffused or circumscribed, variously-sized lesions, which usually are not raised above the integument. To its various manifestations, according as it appeared in the form of small spots or in larger lesions, various names were applied by the older writers which are at present without warrant. Erythema may be either idiopathic or symptomatic.

**Idiopathic Erythema.**—Idiopathic erythema may be brought about by a great number of external irritants acting locally, such as heat and cold, the rubbing of ill-fitting garments, the presence of animal or vegetable poisons, etc. Practically, its two most important forms are erythema pernio, or chilblain, and erythema intertrigo. The first has received attention under the head of Dermatitis Calorica, and the latter only will receive attention here.

**Erythema Intertrigo.**—This form of the disease begins as simple hyperæmia of the skin in parts exposed to friction from opposed surfaces, and in children especially is often evoked by urinary and fæcal discharges. In cases of any severity the skin is hot and tender; there is hyperidrosis; the epidermis becomes macerated, and the parts are often bathed in a muciform discharge which emits an offensive odor. When neglected, the parts may become fissured, raw, and even ulcerated. We find the disease oftenest about the groin, the neck in fat infants, the gluteal folds, and the inner aspects of the thighs. It occurs most often in hot weather. It is usually easy to prevent the occurrence of intertrigo. The observance of cleanliness, frequent changing of diapers, and removal of all irritating discharges will accomplish this, with the aid of a dusting powder, as—

℞. Zinci oxidi, ʒij;
Pulv. seminis lycopodii, ʒvj.—M.

When the disease is established, the parts should be kept apart by

lint on which an astringent powder such as the following has been dusted:

℞. Thymol., gr. j;
Pulv. zinci oleatis, ʒj.—M.

Duhring recommends diluted lotio nigra in obstinate cases. One of the best applications is Lassar's paste as modified by Dr. G. H. Fox:

℞. Acidi salicylici, gr. xxx;
Bismuthi subnitratis,
Pulv. amyli, āā. ʒvj;
Unguent. aquæ rosæ, ʒij.—M.

This paste is to be spread over the involved area. It is curative and affords protection from discharges.

**Symptomatic Erythema.**—When we consider the anatomical and physiological peculiarities of the skin and its intimate connection with the general system, it is easily understood that many morbid states bring about circulatory disturbances of the integument. Hyperæmia is one of the most frequent of these disturbances. Erythematous rashes occur at times with variola, diphtheria, cholera, meningitis, vaccinia, etc. One of the most important of the symptomatic erythemata is that which precedes the true eruption of variola. The chief importance of all this class of erythemata lies in their resemblance to the exanthematous fevers. The treatment of symptomatic erythema has for its first object the discovery and removal, if possible, of the cause upon which depends the eruption on the skin. The withdrawal of certain foods and drugs is thus indicated. Locally, the treatment is simple. A soothing lotion fulfils every indication, and one of the most efficacious is the compound zinc-and-calamine lotion:

℞. Zinci oxidi, ʒss;
Pulv. calaminæ, ℈iv;
Glycerini, ʒj;
Liquor. calcis, fʒvij.—M.
Sig. Mop on the affected part.

**Erythema Multiforme.**—Erythema multiforme is an exudative affection characterized by various erythematous, papular, tubercular, vesicular, bullous, and nodose lesions. The papular and tubercular forms are most common. A feeling of malaise, sore throat, and rheumatoid pains may precede the attack, and even graver complications have been reported, as inflammation of the heart or lungs. The usual sites

of the eruption are the backs of the hands and feet, though it may appear upon any portion of the body. The subjective symptoms consist of burning, itching, or a feeling of tension in the skin. According as one or another of the elementary lesions form the prevailing type, the disease has received various names, as E. annulare, E. iris, E. gyratum, E. tuberculatum, etc. There can be little doubt that herpes iris and erythema nodosum belong to this group of diseases.

**Herpes Iris.**—The lesion in this form of the disease appears as a vesicle seated on an erythematous base. As the vesicle increases in size the red areola extends, becoming in time elevated by fresh effusion into an annular ring; in the mean time the original vesicle has become absorbed, leaving a purplish discoloration. This may terminate the process, or other concentric rings may form. The various shades of color thus produced give to the eruption its name. The subjective symptoms consist of burning and itching, usually slight. The usual sites of this eruption are the backs of the hand and feet.

**Erythema Nodosum.**—Before the eruption appears in this form of erythema there are usually marked prodromal symptoms, such as malaise, fever, rheumatoid pains, and sometimes sore throat. The lesions appear in two or three successive crops, and consist of discrete, node-like, painful swellings, varying in size from a small nut to an egg, or even larger. They are at first of a reddish color and firm and tense to the feel, but during their evolution they become softer, sometimes simulating fluctuation, and their color passes through the various hues of a bruise. The eruption is most frequently seated on the front of the legs.

The whole course of the disease may extend over two to four weeks. In the treatment of the various forms of erythema, as elsewhere, the question of any exciting cause should be considered, and all complications should receive attention.

Villemin recommends iodide of potassium as a specific. Should constipation exist, the mistura ferri acida, given in doses of a tablespoonful in a glass of water before breakfast, is an excellent remedy. Cod-liver oil and tonics are of service in anæmic persons. Locally, calamine-and-zinc lotion, to which $\frac{1}{2}$ drachm of carbolic acid to each 8 ounces has been added, is soothing and beneficial. In E. nodosum a lead lotion should be kept constantly applied, and the limbs should be elevated. In the tubercular form of erythema, occurring on the hands, diachylon ointment spread on muslin should be neatly applied and kept in place by a bandage.

## Urticaria.

Urticaria, commonly called nettle-rash and hives, is an inflammatory disorder of the skin characterized by the development of

wheals, which give rise to subjective sensations of burning and itching. The urticarial efflorescences come out suddenly in large or small numbers, remain for from a few minutes to several hours, and disappear as abruptly as they came, usually leaving no trace behind. The mucous surfaces, mouth, pharynx, respiratory tract, and stomach, may also be implicated.

Various terms have been invented to express certain lesional features that the disease may assume, such as U. tuberosa, U. bullosa, U. hæmorrhagica, U. œdematosa, and U. papulosa. The last-mentioned form occurs in children (lichen urticatus), and in these cases, as a result of the inflammatory effusion, a small solid papule remains after the subsidence of the wheal.

Urticaria may be acute or chronic; in the first instance the outbreak occurs one or more times only, while in the chronic form the disorder may be kept up for an indefinite period by successive attacks. It is the result of various direct and indirect agencies acting upon the vaso-motor system.

Among the local exciting causes may be mentioned bites of insects, coarse under-garments, etc.; and among the indirect causes may be noted, first and most commonly, gastro-intestinal derangements due to a great variety of foods and medicines, intestinal worms in children, and malaria. Various affections of the generative organs, chronic disorders of the stomach, bowels, and kidneys, and disturbances of the brain and spinal cord are often responsible for the chronically recurring type of the disease.

In all cases of urticaria the offending cause should be diligently sought for and removed when possible. Acute attacks are usually due to stomachic disturbance from irritating food or food for which the patient possesses a special idiosyncrasy; and it is necessary in such cases to administer an emetic, and later on a mild aperient. When an acute attack is kept up by repeated exacerbations for several days, it is likely that the mucous membrane of the stomach is similarly affected, and the treatment should consist of the free use of bismuth and bicarbonate of sodium, while alkaline mineral waters may be drunk *ad libitum*.

The successful management of chronic urticaria will often tax the ingenuity of the physician to the utmost; thus it is necessary to study the history, habits, and health of each patient in every detail. Unfortunately, in many instances the most rigid investigation of the diet and the most searching interrogation of the various organs and functions of the body will fail to show any obvious cause for the recurring attacks. Under such circumstances we must resort to empirical remedies.

Belladonna and atropine may be tried in appropriate doses. C.

Heitzman has obtained good results from ergot, and the salicylate of sodium has sometimes succeeded in permanently breaking up the recurrences. Antipyrine in 8-grain doses, if given a few hours before the expected attack, will often abort it. Stern thinks highly of iodide of potassium in chronic cases, and the writer has known of excellent results following its use. Riffat gives tincture of strophanthus, 15 to 20 drops in twenty-four hours, and claims that it will often break up an acute attack, besides being of especial value in the chronic form. Ichthyol, 10 to 30 grains daily in pill or capsule, is highly regarded by Unna and Pringle. Five drops of the wine of antimony three times a day frequently do good. In order to secure sleep in severe attacks Jamieson advises sulphonal.

Locally, the common domestic remedies, such as lotions of soda-water, brandy, cologne, lemon-juice, vinegar, and alcohol, afford relief to the burning, tingling, and itching.

Carbolic acid is, however, by far the best antipruritic remedy in our possession. It may be mopped on with a rag, although it is much more efficacious when sprayed through an atomizer. It may be used according to the following formula:

℞. Acidi carbolici, ʒij–iv;
Glycerini, fʒj;
Aquæ, q. s. ad ʒxvj.—M.
Sig. Use as a spray.

To increase the effect, 5 to 10 drops of the oil of peppermint may be added to each atomizerful of the preparation.

The liquor picis alkalinus and liquor carbonis detergens may also be used in the same strength as the carbolic acid. Menthol in solution is also grateful:

℞. Menthol., ʒss–ij;
Alcoholis, fʒj;
Glycerini, fʒj;
Aquæ, fʒiv.—M.
Sig. Apply freely. (*Bulkley.*)

Calamine-and-zinc lotion with carbolic acid is an agreeable application:

℞. Acidi carbolici, ʒj;
Zinci oxidi, ʒss;
Pulv. calaminæ, ℈iv;
Glycerini, fʒj;
Liquor. calcis, fʒvij.—M.
Sig. Mop on freely.

Ointments sometimes give more relief than lotions. Chloral and camphor (of each ½ to 1 drachm in 1 ounce of ointment of rose-water) may be employed on limited patches, and so may menthol and vaseline in about the same strength. Macintosh's cream is very soothing:

℞. Bismuthi subnitratis, ʒij;
Zinci oxidi, ʒss;
Glycerini, fʒiss;
Acidi carbolici (liquid.), ♏xx–xxx;
Vaselini, ʒvj.—M.
Sig. Apply with fingers or brush.

Powders may afford relief when other means fail. Both Anderson's and Bulkley's preparations are valuable:

℞. Pulv. amyli, ʒvj;
Zinci oxidi, ʒiss;
Pulv. camphoræ, ʒss.—M.
(*Anderson.*)

℞. Chloralis,
Camphoræ, āā. ʒj;
Pulv. amyli, ʒj.—M.
(*Bulkley.*)

Warm alkaline baths, followed by inunctions with carbolized vaseline, and the faradic and galvanic currents, may be resorted to in the treatment of obstinate cases.

**Urticaria Pigmentosa.**—This is a rare type of urticaria, which begins within the first few months of life, and consists of large reddish, wheal-like tubercles that eventually change to a brownish-red or yellowish color. Itching may or may not be present. The disease runs a protracted course, but tends to spontaneous recovery at puberty. No treatment has proved of avail in breaking up the manifestations of the disease. The local management is entirely symptomatic.

## Dermatitis.

The term dermatitis is usually limited to those varieties of cutaneous inflammation due to the action of irritants, whether the morbid influence is from without—*e. g.* cold, traumatism, heat, chemical agents, etc. —or is the result of the ingestion of drugs, articles of diet, etc., and does not include inflammations of an idiopathic or unknown character.

**Dermatitis Traumatica.**—In this group are to be found those inflammatory changes in the skin resulting from traumatism, such, for example, as excoriations and abrasions from scratching, from the pres-

sure of tight or ill-fitting shoes, awkwardly-applied bandages, braces, etc. There are marked pigmentation and induration of the skin when the source of irritation is long continued. The treatment consists in the removal of the cause and the application of remedies of a soothing character.

**Dermatitis Venenata.**[1]—This title is usually accepted as meaning all forms of inflammation of the skin produced by external irritating agencies, whether from the animal, vegetable, or mineral kingdom. The number of substances capable of exciting this pathological state is exceedingly large, and those liable to such attacks are to be found in all the relations of life. White has shown that in the vegetable world alone more than sixty plants are to be found in the United States that may give rise to varying degrees of dermatitis. In particular there are three species of plants found in this country that are capable of producing active inflammation of the skin of individuals exposed to their influence, whether from actual contact or mere proximity. These are *Rhus toxicodendron,* or poison ivy, *Rhus venenata,* or poison sumach, and *Rhus diversiloba,* or poison oak. The last named is met with on the Pacific coast. The character of the dermatitis from rhus-poisoning varies in intensity : sometimes it is merely an erythema or there are a few scattered papules, or else there supervenes acute swelling of the skin with the formation of vesicles, pustules, and blebs. There are marked sensations of itching and burning. The hands, face, and genitals are usually involved, sometimes the entire surface. The disease may last from one to six weeks. The poisonous principle, a volatile acid, may be conveyed in an early stage of the affection from one part of the body to another, or perhaps to a second person ; but, according to White, after the poison has been absorbed or removed by washing or volatilization there is no risk of contagion. The effects of exposure show themselves in from a few hours to four or five days.

Susceptibility to rhus-poisoning, once established, would appear to be permanent.

The treatment of dermatitis venenata should be conducted on general principles, taking care of course to rid the skin of the source of irritation as soon as possible. There are many so-called specifics for rhus-poisoning, for the reason that the dermatitis varies greatly in degree and the affection runs a tolerably definite course. Under any circumstances a method of much value is to wash the affected parts immediately with soap and hot water. This is to be done freely and for a considerable time. As a medicinal application I have found hourly mopping with sulphate-of-zinc lotion of the strength of from 1 to 4 drachms to the pint to be of much service. Black wash—calo-

[1] For a full treatment of this subject see White's valuable monograph on *Dermatitis Venenata,* Boston, 1888.

mel 1 drachm, lime-water 1 pint—is an excellent application used as a lotion upon linen for half an hour at a time. This should not be used over too extensive surfaces. A remedy of universal application is, according to White, made as follows:

℞. Zinci oxidi, ʒiv;
Acidi carbolici, fʒj;
Liquor. calcis, Oj.—M.
Sig. Shake and mop over affected surface frequently, day and night.

**Dermatitis Calorica.**—The effects on the skin of varying degrees of heat and cold are included under this head, as, for example, sunburn, common burns and scalds, frostbites and chilblains. The clinical symptoms are very similar in these affections, whether the exciting agent be heat or cold, and there may be present all grades of disturbance, from simple hyperæmia up to gangrene of the skin.

The treatment of a burn of the first degree—namely, that condition in which there is redness, heat, and swelling, with considerable pain, followed by desquamation—should be of a soothing character. A saturated solution of sodium bicarbonate, applied by means of cloths of suitable size, is an excellent and convenient remedy. Later on, in the desquamative stage, a soothing ointment may be employed. In burns of the second degree, where blisters have formed, the contents of the blebs may be evacuated, taking care, however, to leave the roof of the blisters intact, as they form the best protection to the inflamed tissues beneath. Carron oil (equal parts of lime-water and linseed oil), to which may be added 1 minim of creasote to the ounce, is probably the best local application.

In inflammation of the skin the result of cold the patient should be placed in a cool room, and the affected parts should be restored to a normal temperature by being rubbed with snow or else by the application of cold water. Sloughing and ulceration should be managed on antiseptic principles. As chilblains occur mostly in weakly children, tonics of bark and iron are usually indicated. Locally, stimulation is generally demanded. When the surface is unbroken the affected region may be painted with tincture of iodine or with oil of peppermint either pure or diluted with glycerin (1 to 6). Kaposi recommends the following application:

℞. Pulv. camphoræ, gr. x;
Cretæ præparatæ, ʒj;
Olei lini, fʒij;
Balsam. Peruvianum, ♏xx.—M.
Sig. For local use.

Morrow suggests the following prescription:

| | | |
|---|---|---|
| ℞. | Acidi carbolici, | f℥j; |
| | Tinct. iodini, | f℥ij; |
| | Acidi tannici, | ℥j; |
| | Cerati, | ℥iv.—M. |
| Sig. | Apply two or three times a day. | |

**Dermatitis Medicamentosa.**—A large number of drugs when taken internally produce various eruptions upon the skin. Sometimes this is only an occasional effect; in other cases it would seem to be a special idiosyncrasy which is always in operation; or, lastly, certain drugs, if taken long enough, will almost invariably give rise to lesions of the skin. Erythematous, scarlatiniform, and urticarial rashes are the more usual eruptive forms; less frequently they are papular, pustular, bullous, purpuric, and nodular.

The obvious treatment of the medicinal eruptions is to withdraw the exciting agent, when usually the local disturbances rapidly pass away. The local treatment will depend upon the nature of the lesions.

**Dermatitis Gangrenosa.**—Gangrenous inflammation of the skin has been frequently observed in symptomatic relationship with cases of cerebral and spinal disorders, diabetes, etc. Then, again, circumscribed gangrene of the skin is occasionally noted in connection with varicella, vaccinia, pemphigus, and herpes occurring in cachectic subjects. There would seem to be, however, a very rare idiopathic affection of the skin, characterized by erythematous, reddish or purplish, painful or painless, circumscribed spots, occurring symmetrically, which finally become gangrenous. Recovery may take place, or else the patient will finally succumb. There may be thirty or forty such lesions. The progress of the malady is tedious, whatever may be the outcome of the case. The physician should be on the outlook for malingering, as there is reason to believe that some of the instances of gangrene occurring in neurotic girls have been feigned.

The constitutional treatment must be tonic, including especially quinine and iron, together with appropriate exhibition of stimulants and digestible food. Locally, soothing or slightly stimulating salves may be prescribed.

## Erysipelas.

Erysipelas is an acute contagious inflammation of the skin and subcutaneous tissue, due to the presence of micro-organisms, and characterized by well-pronounced local and general symptoms. It is with the disease as it affects the skin that the dermatologist is interested. Prior to the local manifestation of the disease there are usually fever-

ishness, malaise, and nausea, and often a distinct chill, followed by fever. The degree of the fever and its duration go hand in hand with the severity of the local manifestation. The skin lesion is prone to make its appearance first about one of the muco-cutaneous outlets of the body, as at the nostrils, angles of the mouth, the inner canthus of the eye especially, at the meatus of the ear, etc. It also often commences at a mole or wart or where there is some wound of the skin. The disease begins as a rosy-red spot, which advances along its periphery, often with surprising rapidity. The affected surface is swollen, hot, tender, hard, and brawny to the touch, and its margin is sharply defined and elevated above the surrounding skin. In severe cases the rosy-red color gives place to a dusky or even livid hue, and vesicles and blebs may form, containing at first clear serum, which becomes semi-purulent, and finally dries up, leaving crusts. In unfavorable cases the contents of these blebs are often hæmorrhagic. Often the outlying parts display streaks and patches of redness, which become merged into the general coloration, indicating an implication of the lymphatics. The process may extend widely, the whole surface being involved, or only a limited region may be affected. As the disease abates the redness usually fades first in the centre. The lymphatic ganglia are often affected, becoming enlarged and tender, and at times suppurating. The subjective symptoms consist of burning, itching, and a sense of tension in the part. There is usually great tenderness to even light pressure, or passing the finger lightly over the surface may evoke it. The subsidence of the disease is followed by desquamation. There are often relapses, and especially is this true of a mild form occurring on the face. It is now generally admitted that erysipelas depends on the presence of the chain coccus of Fehleisen, the germ in the vast majority of cases gaining access through some wound. This suggests the importance of prophylactic measures, the isolation of all cases of erysipelas, and the careful antiseptic treatment of even slight wounds. In mild cases no internal remedies are demanded, but in all severe forms of the disorder the careful nourishment and stimulation of the patient demand most attention.

Among drugs tincture of chloride of iron has enjoyed an extended reputation. It may be given in doses ranging from 20 to 60 minims, administered every few hours. Jaborandi and pilocarpine have been extolled by DaCosta, but he warns us of the depressing effects of these drugs on the heart. Antipyrine and other antipyretics are to be used when the fever runs high. As in all diseases which pursue so variable a course, many therapeutic means have been used with apparent success by many observers.

Space forbids the enumeration of the manifold methods of local treatment. Perhaps no topical application gives more relief than car-

bolic acid. This may be applied by cotton compresses wrung out in a $2\frac{1}{2}$ per cent. solution of the drug, covered by rubber tissue and held in place by bandages. Or, where this "poultice" is inconvenient and disagreeable, as about the face, an ointment may be used, formed by mixing equal parts of prepared chalk and melted benzoated lard. To every ounce of this mixture half a drachm of carbolic acid should be added. This ointment should be thickly spread on the diseased surface and covered by a thin cloth or lint. Unna recommends the following, which I have found useful:

℞. Ichthyolis,
Ætheris, āā. fʒj;
Collodii flex., fʒij.—M.
Sig. Apply with a camel's-hair brush.

Efforts at limiting the advance of the disease by applications of nitrate of silver around the border of the patch are not now advocated, and it is questionable if scarifications made with the same intent can accomplish this purpose. The hypodermic injection of a 5 per cent. solution of carbolic acid into and around the affected area does not seem to have borne the fruits expected of it.

## Furunculus.

A furuncle is an acute, circumscribed, phlegmonous inflammation, occurring round a skin-gland or follicle, that terminates in suppuration and the expulsion of a central slough or core. Boils may occur singly, or several may be present at the same time; on the other hand, the morbid condition may be kept up by a succession of crops, constituting the state known as furunculosis. With the exception of the palms and soles, boils may appear anywhere on the body, but seem to have a special predilection for the posterior part of the trunk. They also attack the ceruminous glands of the ear and the borders of the lids (styes). Ordinarily, boils cause very little systemic reaction, but in children, when the furuncular diathesis is established, there is usually restlessness, anorexia, and marked emaciation, due to the pain and free discharge of pus.

Boils begin around the hair-follicles and the sebaceous and sweat-glands, and there is no doubt that the inflammation is induced by the invasion of pus cocci; indeed, the presence of pus cocci in the pus of furuncles, the clinical fact of contagion, and the successful inoculation of pure cultures would seem to establish beyond question the essential parasitic nature of the process. Since, however, these micro-organisms are found so profusely in our every-day surroundings, it is possible that ordinarily they come into contact with us, or are even introduced

into our bodies, without evil consequences; but to exert a pathological influence a suitable soil is necessary, such as is found, for example, in disorders of nutrition, pruritic skin diseases, etc.

Whenever practicable, the existing cause or causes should be removed, a suitable diet ordered, and the general rules of hygiene enforced; in other words, the patient should be put in the best possible condition of health. The urine should be examined for sugar and albumin, for it is well known that sufferers from Bright's disease and diabetes are prone to furunculosis.

Since defective drainage and the presence of arsenical wall-papers are also causative factors, these matters should not escape attention. All local sources of irritation should be sought out and removed. Change of air and scene will sometimes succeed when everything else has failed.

Various remedies are lauded as specifics in boils. Half a wineglassful of yeast night and morning has been used with asserted beneficial result. The hyposulphites and sulphurous acid often seem to do good. The sulphide of calcium, both in large and in small doses, has been much extolled, but it is difficult to make a positive statement as to its real merits. Indeed, it is likely that if the physician would cease looking for specifics, and would busy himself instead with a careful symptomatic treatment, he would meet with speedier success.

An effort should always be made to prevent, or at least limit, suppuration as much as possible. Various local expedients have been recommended with this object in view. When a commencing boil is penetrated by a hair, the latter should be epilated and very hot water applied several times a day. Tuholske aborts boils by introducing an electrolytic needle. Bidder injects a 2 per cent. carbolic-acid solution in one or more places, according to the size of the lesion. L. Heitzman strongly recommends a salicylic-acid plaster made as follows:

℞. Acidi salicylici, ℥ij;
Emplast. saponis, ℥ij;
Emplast. diachyli, ℥j.—M.
Sig. Spread on cloth.

Among other remedies may be mentioned iodine, boric acid in saturated solution, and ichthyol. Unna's carbolic-acid-and-mercury plaster mull will sometimes prevent suppuration, but it is a particularly useful application after pus has formed, since it hastens the process materially. A hole should be cut in the centre of the plaster corresponding to the apex of the boil. When many boils are present Veiel uses a paste made of equal parts of oxide of zinc and vaseline,

with 4 per cent. of boric acid. This ointment is well rubbed into the skin around the boil three times daily, and is also applied spread on lint over the boil. In general furunculosis the whole body is rubbed with the paste. Whatever treatment is employed, it is a most excellent plan to smear Veiel's paste on the skin contiguous to the furuncle, so as to prevent auto-infection. As soon as the centre of the boil has become soft, but not before, it should be opened and the cavity treated antiseptically, the best agents for this purpose being iodoform, iodol, or carbolized oil. Sweat-gland boils, according to Crocker, should be painted with a layer of collodion. Auditory furuncles and styes will receive consideration in other sections of this work.

## Anthrax.

Anthrax, or carbuncle, commences somewhat like a furuncle, but the area of redness is usually from the first larger and the infiltration more extensive. As the process advances the infiltration increases, till it may assume vast proportions, being at times six inches in diameter, and at the same time the color assumes a dusky or purplish hue. There is pain of a throbbing and burning character. Usually by the end of two weeks the process has attained its acme, and several openings, indicating its development from several foci of infection, form in the carbuncle, through which may be seen a dirty-gray slough or core. After a time these openings unite into a ragged cavity, from which pus and necrotic tissue are discharged. Recovery may now ensue by granulation and cicatrization, or the slough may extend and the patient pass into a typhoid condition and die of sepsis. Any weakened or depraved state of health predisposes to carbuncle, and it is especially often seen in diabetes mellitus. Its etiology is similar to that of furuncle, save that the virus seems to be implanted in several hair-follicles at the same time.

The general state of the health should receive most careful attention. Iron, quinine, and stimulants should be given freely. A narcotic will often be required to relieve the pain. Sulphide of calcium in full doses may be tried. As to local treatment, if there is much tension of the inflamed part a crucial incision, with vigorous curetting of any necrotic tissue found, hastens the process of recovery. After such measures a carbolic poultice of the strength of $2\frac{1}{2}$ per cent. ensures antisepsis, gives relief to the pain, and encourages the separation of any necrotic fragments which may have been overlooked. Sometimes in the early stage less radical measures will suffice. Painting collodion over the inflamed area and for half an inch all round sometimes has an excellent effect. Pieces of Unna's carbolic-acid-and-mercury plaster, cut to fit, have given good results in my hands, caus-

ing rapid subsidence of the process. A 10 per cent. ichthyol salve is also useful.

The hypodermic injection of a 5 per cent. solution of carbolic acid into the carbuncle has been recommended. After the slough has come away, iodoform dusted over the exposed surface is an excellent stimulant and drying agent.

## Pustula Maligna.

Malignant pustule is a gangrenous affection of the skin occurring on an exposed portion of the body and due to the inoculation of the *Bacillus anthracis.* The specific cause of the disease is derived from some animal infected with splenic fever. The disease-germ may gain entrance into the system through the intestinal tract or by way of the pulmonary mucous membrane, constituting the internal form of the malady. The external form of the disease, which is of interest to the dermatologist, is produced by the direct inoculation of the *Bacillus anthracis* upon the skin. This occurs chiefly in butchers, tanners, wool-sorters, and those who handle in any way the diseased animals. From one to three days after inoculation a red papule appears, upon which a bulla or pustule soon forms. The bulla or pustule ruptures and a gangrenous surface is exposed. A crop of vesicles appears around this area, the surrounding skin being red, indurated, and much swollen. The adjacent lymph-vessels and ganglia become enlarged, and the latter sometimes suppurate. Death from acute septicæmia often terminates the case in from one to six days. In favorable cases the gangrenous tissue is cast off.

The most radical treatment consists in the complete and early excision of the diseased area, combined with the administration of tonics and stimulants. After the removal of the pustule and indurated tissues the wound should be kept dressed with a solution of permanganate of potassium, 2 to 5 per cent., or bichloride of mercury, $\frac{1}{10}$ per cent.

## Herpes Simplex.

Under this title it is customary to include herpes facialis, or febrilis, and herpes progenitalis.

**Herpes Facialis.**—This is an acute, non-contagious, inflammatory disorder which appears in the form of one or more groups of vesicles. The eruption is commonly called fever blisters. Its usual seats are the lips, angle of mouth, and face generally below the forehead. The mucous membranes are also subject to its attacks. Herpes facialis is generally symptomatic of febrile disorders, and is often ushered in with chill and rise of temperature; in other instances, however, it is the result of gastro-intestinal disturbance or of simple external irritation.

The treatment is simple, and consists principally in protecting the vesicles from premature rupture. The zinc-and-calamine lotion makes a good application. When the lesions are about the angle of the mouth, especially in children, the patch should be painted with a little flexible collodion, otherwise the irritation of saliva, etc. may produce a sore of considerable size.

**Herpes Progenitalis.**—Herpetic vesicles are common in the male sex, affecting principally the glans and prepuce, and presenting lesions of the size of a pin's head to a small pea, and from two or three to a dozen in number. They soon burst and show little circular erosions seated on a reddened base. The affection is rare in women.

The vesicles of herpes progenitalis should never be cauterized, since such treatment is always mischievous, besides giving rise to great confusion in diagnosis. Dusting powders of carbonate of magnesium and the interposition of dry lint between the preputial surfaces generally suffices. A mild bismuth salve may be applied on lint if the parts are much inflamed. If suppuration has occurred, iodol or iodoform powder will prove curative.

The prophylactic treatment requires the removal of all sources of irritation and the operation of circumcision for redundant prepuce.

## Herpes Zoster.

Herpes zoster, zona, or, popularly, shingles, is an inflammatory disease of the skin which consists of grouped vesicles on a reddened base, the lesions being distributed in relation to the course of the cutaneous nerves. The most frequent seat of the disease is around the trunk, following the distribution of the intercostal nerves, but it may occur in the course of any cutaneous nerve. The outbreak of the eruption is usually preceded by considerable neuralgic pain, which may persist throughout the course of the disease, and in elderly people for months or years afterward.

The disease is most frequent in young people, and is most commonly prevalent in the autumn and spring of the year, when the weather is variable. It is thought by some authorities that zoster is an infectious disease and should be classed with the acute exanthemata. Hutchinson and others believe that the disorder is apt to occur in persons taking arsenic.

Zoster is an acute, self-limited disease, and runs a very variable course, so that dogmatic assertions about the success of this or that method of treatment should be received with caution. Various internal remedies, such as phosphide of zinc, tincture of rhus toxicodendron, etc., have been brought forward from time to time as capable of aborting the eruption, but it is doubtful whether they have the effect ascribed to them.

Jamieson states that if the nature of the premonitory neuralgia of zoster be recognized in time, a blister over the spine on the painful side will partially or completely prevent the appearance of the vesicles; Duhring believes that the timely use of the galvanic current will effect the same result; Unna relies on ichthyol mixed in water and painted over the eruption, or a paste of zinc and resorcin; Leloir[1] uses alcohol pure or an alcoholic solution of resorcin, thymol, and several other drugs in the abortive treatment. It is said that this method is effectual in any stage of this disease, and also in herpes simplex. The pain of zoster is also much alleviated by these applications. The following are some of the formulæ employed by Leloir:

| | |
|---|---|
| ℞. Alcoholis (90 per cent.), | f℥j; |
| Resorcini, | gr. x.—M. |
| ℞. Alcoholis (90 per cent.), | f℥j; |
| Menthol, | gr. xv; |
| Ext. cannabis indicæ, | gr. xxv.—M. |
| ℞ Alcoholis (90 per cent.), | f℥j; |
| Ext. cannabis indicæ, | gr. xxv; |
| Cocain. hydrochlor., | gr. vj; |
| Spirit. menthæ piperitæ, | ♏vj.—M. |

These various solutions are applied by means of pads made of wadding, that are frequently renewed during the day.

Usually, when the patient comes for treatment the eruption is well developed. The choice of local applications is tolerably wide, but the main point is to avoid rupturing the lesions. Ointments should be absolutely eschewed. Flexible collodion, with or without morphine, makes an admirable protective dressing, as it relieves pain and keeps the vesicles intact. Rice powder or corn starch, to which oxide of zinc, camphor, or morphine may be added, is of excellent service when freely dusted in the meshes of "lintine" and firmly bound over the affected surface. Oil of peppermint, both for the acute stage and for the lingering neuralgic pains, is highly recommended by Meredith. When the lesions have been accidentally broken and the parts are ulcerated, it is proper to use diachylon ointment, and under certain conditions iodoform may be added to it in the proportion of 1 drachm to the ounce. For the relief of the pain of zoster, morphine hypodermically may be demanded; but usually a current from ten or twelve cells of a galvanic battery passed through the eruption will materially moderate the suffering. For the persistent neuralgia

[1] *British Journ. of Dermatology*, Aug., 1891.

that so often follows zoster in the adult, galvanism, applied in the course of the affected nerve, is of special value; at the same time the appropriate general tonic treatment should not be neglected.

## Dermatitis Herpetiformis.

According to Duhring,[1] dermatitis herpetiformis is an inflammatory disease of an herpetic character, the various lesions showing a tendency to group. It is a protean malady, and manifests itself in various elementary forms, such as erythema, vesicles, blebs, and pustules that are at one time distinct, or they may coexist, constituting a mixed eruption. Multiformity of lesion is therefore a prominent characteristic. The commonest expression is the mixed eruption, with the vesicular element predominating. In severe cases certain invasion symptoms in the form of malaise, more or less fever, alternate hot and cold sensations, together with pruritus, are to be observed several days before the cutaneous manifestations declare themselves. Itching and burning are the most marked subjective sensations, while crusting, infiltration, and pigmentation are prominent secondary features. The course of the disease is variable, but usually chronic, relapsing, and of indefinite duration.

The treatment is usually unsatisfactory, especially as regards the prevention of relapses. Tonic remedies are nearly always indicated, particularly cod-liver oil in debilitated subjects.

Tilbury Fox relied on quinine in large doses, and Crocker has obtained good results from arsenic when pushed to the limits of tolerance. Tincture of belladonna has sometimes succeeded when arsenic has failed (Crocker). It should be given in 15-minim doses, three times a day at first, and gradually increased up to 30 minims or more. The writer's opinion is that the more frankly bullous the eruption is, the better it can be controlled by the drugs just mentioned, but that in the mixed forms they are often inoperative.

Locally, the treatment should be addressed to relieving the pruritus and soothing the inflamed integument. To this end recourse may be had to warm alkaline and bran baths, baths of sulphide of potassium (2 to 4 ounces in 30 gallons of water), or in the pemphigoid cases to the continuous immersion bath of Hebra. Generally, soothing lotions and liniments are more available, such as the compound lotion of oxide of zinc and calamine, lime liniment with carbolic acid, and Crocker's calamine liniment:

[1] The "Diagnosis of Dermatitis Herpetiformis," *American Journ. of the Med. Sciences*, Feb., 1888; also articles on "Diseases of the Skin" in Pepper's *System of Medicine*, by Duhring and Stelwagon.

℞. Pulv. calaminæ præparat., ℈ij ;
Pulv. zinci oxidi, ʒss ;
Olei olivæ,
Liquor. calcis, āā. ʒj.—M.
Sig. Apply on soft rags.

Duhring advises that a strong sulphur ointment be forcibly rubbed into the patches, and claims that in this way the pruritus is greatly lessened and the eruption is often made to disappear. He employs an ointment of 1 or 2 drachms to the ounce. Ichthyol may be also prescribed for the same purpose. Schwimmer has seen favorable results from an aqueous solution of thiol :

℞. Thioli, ʒiiss ;
Aquæ dest., ʒij.—M.
Sig. Paint upon eruption with camel's-hair brush.

## Psoriasis.

Psoriasis is a chronic inflammatory disease of the skin, characterized by variously sized lesions having red bases, covered with white scales resembling mother-of-pearl, which affect by preference the extensor surfaces of the body. In this country it represents about 3 per cent. of all cases of skin disease.

In the beginning the disease consists of minute congested spots or points that early show a tendency to the characteristic scaling. The eruption is made up of multiple lesions, which by peripheral extension may attain various dimensions ; but, having reached a definite size, the papules may remain isolated, or else they may run together, and thus form patches of different sizes and shapes.

Although the lesions may thus assume different forms and vary considerably in extent, they all, as a rule, possess certain definite characteristics—viz. they are infiltrated, elevated, clearly defined, covered with white, shining, easily-detachable scales, which upon removal reveal a red, punctate, bleeding surface. The eruption at all times is absolutely dry, there being no discharge or exudation, and itching is usually absent. The disease is symmetrically disposed, and affects by preference the extensor surfaces, particularly the elbows and knees. It is almost invariably found on the scalp, and in severe attacks upon the trunk as well.

Psoriasis is essentially a chronic malady, although a given outbreak may have an acute aspect. Frequent relapse is the rule, and in some cases the patient is never entirely free of his disorder.

The etiology of psoriasis is obscure. Heredity plays a considerable rôle in its production. The parasitic nature of the disease has not been

satisfactorily substantiated. Psoriasis bears a resemblance to eczema in the fact that a great many exciting influences, external and internal, may evoke it.

In the treatment of psoriasis it is of considerable importance to have an eye to the general condition of the patient: the relief of the eruption, for example, is much expedited if any coincident trouble from which the patient may be suffering is first remedied. Iron is of much value in anæmic children, and cod-liver oil and malt extract are useful in the strumous. In the full-blooded subject of gouty habits alkalies and colchicum are very efficient. The following mixture is recommended by A. R. Robinson:

℞. Potassii acetatis, ℥j;
Spiriti ætheris nitrosi, ʒiv;
Vini colchici, ʒij;
Syrupi. aurantii, ℥iss;
Aquæ carui, q. s. ad ℥vj.—M.
Sig. A dessert-spoonful after meals in a wine-glassful of water.

Arsenic may be combined with this mixture in suitable doses.

When the eruption is of an acute type wine of antimony in 5- or 6-minim doses, three times a day, may be given with benefit, as recommended by Morris.

Very often, probably in the majority of cases, patients with psoriasis are in perfect health, and exhibit no indications at all in the direction of symptomatic treatment; in such instances, if we desire to resort to internal medication, we must have recourse to empirical remedies.

Arsenic stands at the head of the list, a position that it has maintained since its first introduction by Girdlestone for this purpose. The remedy may be given in various forms and combinations, but in this country and in England it is usually administered in Fowler's solution, preferably combined with iron, as follows:

℞. Liq. potassii arsenitis, ʒj–ij;
Vini ferri, q. s. ad ℥iv.—M.
Sig. A tea-spoonful directly after meals in a wine-glassful of water.

By many authorities it is taught that the dose of arsenic should be pushed to the limit of tolerance, but the writer believes that it is rarely necessary or advisable to give more than 5 minims of Fowler's solution to an adult, that even this quantity should be reached gradually, and that small doses long-continued give better results.

Arsenic acts slowly, and its use must be kept up for a considerable period before its value can be determined in a given instance. Very often the drug is of palpable benefit; again, its action is capricious; and in other cases, even when it is perfectly tolerated, it fails of any therapeutic effect.

Arsenic is contraindicated in acute outbreaks, and seems inoperative in chronic diffuse attacks, but for some unexplained reason the best results are obtained from it in the guttate form of psoriasis.

Various other remedies have been advocated from time to time for the internal treatment—namely, tar, carbolic acid, turpentine, phosphorus, and chrysarobin. Of late years Haslund has highly recommended large doses of iodide of potassium; but the writer has not found any plan of internal medication, not excepting the arsenical method, to be of uniform value, or that cures were more rapid or relapses less frequent than under purely local treatment.

The local treatment is of especial importance. In order that the selected remedy may come in direct contact with the diseased surface, it is necessary that the scales should be thoroughly removed. Warm alkaline baths (carbonate of sodium or potassium, 4 or 5 ounces to water 30 gallons), preceded by frictions with green soap and followed by vaseline inunctions, may be used for this purpose when the disease is chronic and extensive, but in generalized acute cases the soap frictions should be omitted. The scabs may be removed from localized plaques with soft soap and a nail-brush. A solution of salicylic acid in alcohol is also efficient:

℞. Acidi salicylici, ʒj;
Alcoholis, ℥iv.—M.
Sig. Wet a flannel rag with the solution and rub the affected part briskly.

For the direct treatment of the eruption a large number of remedies have been proposed, and the list is being augmented daily; but attention will be drawn in this article only to those whose value has been confirmed by abundant experience.

In spite of certain drawbacks, chrysarobin easily holds the first place in the local treatment of psoriasis. It may be employed in ointment, pigment, or plaster. Ointments give the best and speediest results, but they are dirty, set up considerable dermatitis, and irremediably ruin the under-clothes. The following are examples:

℞. Chrysarobini, ʒss;
Acidi salicylici, ʒss;
Ung. aquæ rosæ, ʒij;
Lanolini, ʒvj.—M.
Sig. Rub in twice daily.

℞. Chrysarobini,
Ichthyollis, *āā.* gr. xx;
Acidi salicylici, gr. viij;
Ung. zinci oxidi, ʒiiiss;
Vaselini, q. s. ad ℥j.—M.

(*Unna.*)

℞. Chrysarobini, gr. x;
Liq. carbonis detergentis, ♏x;
Hydrargyri ammoniati, gr. x;
Adipis benzoati, ℥j.—M.

Sig. Remove scales and rub in ointment for half an hour. Leave the ointment on all night, and bathe in morning.

(*Hutchinson.*)

Although pigments act more feebly than salves, it is better to employ them when the disease is made up of multiple, widely-diffused lesions of small size, as the remedy in this way can be limited to the part desired, and does not come in contact with the intervening skin. Moreover, the chrysarobin paints are cleaner and produce less dermatitis than ointments of the same drug. The preparation advocated by G. H. Fox is made in this way:

℞. Chrysarobini, ʒiiss;
Acidi salicylici, ʒiiss;
Ætheris, ʒiiiss;
Collodii flex., q. s. ad ℥iij.—M.

As a rule, pigments made with the solution of gutta-percha, after Auspitz's method, give more satisfaction:

℞. Chrysarobini, gr. xxx–xlviij;
Acidi salicylici, gr. xxx–xlviij;
Traumaticini, ℥j.—M.

Sig. Apply with a camel's-hair pencil.

In a few days after the application of any one of these pigments the coating begins to peel off; this should be facilitated by a warm bath, after which another application may be put on.

Chrysarobin should not be used on the face, scalp, about the genital organs, or where the skin is very thin. If very much dermatitis is set up, the chrysarobin should be discontinued, and only renewed after its subsidence. If the drug is going to prove of benefit, its good effects are manifested in a few days. It should be kept up till the patches are quite free from scales. The appearances left behind after the use of chrysarobin are quite characteristic, the former areas of disease

remaining for a season preternaturally white, while the surrounding integument is deeply discolored.

Pyrogallic acid in ointment, or better in pigment (1 drachm to the ounce), is somewhat slower in its action than the chrysarobin, but it is more cleanly, and were it not that it cannot be used over large surfaces on account of toxic effects sometimes ensuing, it would in many cases largely take the place of the former. However, for circumscribed areas it may be prescribed in the following formula, suggested by Besnier:

℞. Saponis viridis,
Vaselini, āā. ʒv;
Ichthyollis, ʒss;
Acidi salicylici,
Acidi pyrogallici, āā. gr. xv.—M.

In former years tar was the chief reliance in the local treatment of psoriasis, and it is still employed by many. It may be used in the officinal ointment or as the oleum cadini or oleum rusci, pure or diluted. It is more energetic when combined with soft soap and alcohol:

℞. Saponis viridis,
Olei rusci,
Alcoholis, āā. ℥j.—M.
Sig. Rub firmly into the patches twice daily.

Greenough suggests the following prescription as more elegant in private practice:

℞. Olei cadini,
Glycerini,
Alcoholis, āā. ℥j.—M.

The tar may also be employed as an alcoholic tincture, or the liquor carbonis detergens or liquor picis alkalinus, pure or diluted, may be painted on the patches.

Where there is considerable infiltration the modified Wilkinson's salve, which contains both tar and sulphur, is very efficacious:

℞. Sulphuris sublimati,
Olei cadini, āā. ʒiv;
Saponis viridis,
Adipis, āā. ℥j;
Cretæ præparat., ʒiiss.—M.

Vleminckx's solution, pure or diluted, is useful in similar cases.

Among other topical remedies of more or less efficacy may be mentioned thymol, turpentine, creasote, naphthol, anthrarobin, hydroxylamine, hydracetine, and aristol. Some of these drugs, like hydroxylamine and hydracetine, are perhaps as potent as chrysarobin and the tars, but they possess marked toxic properties; while others, like anthrarobin and aristol, although safe enough, are comparatively inefficacious.

Psoriasis occurring on the face is readily removed by white precipitate salve:

℞. Hydrargyri ammoniati, gr. xx–℥j;
Ung. aquæ rosæ, ℥j.—M.
Sig. For local use.

The mercurial should not be applied to large surfaces, on account of the danger of poisoning.

When the disease affects the scalp, the scales should be thoroughly removed with the tincture of green soap (equal parts of green soap and alcohol), after which some preparation of tar, sulphur, or mercury may be applied, such as the following:

℞. Hydrargyri ammoniati, ʒss;
Liq. picis alkalini, ʒj;
Vaselini, ℥j.—M.
Sig. Apply to scalp.

℞. Olei rusci, ʒj;
Glycerini, ʒij;
Alcoholis, q. s. ad ℥j;
Olei rosæ, q. s.—M.
Sig. Apply with medicine-dropper and rub in thoroughly.

An ointment of sulphur and salicylic acid is also beneficial:

℞. Acidi salicyli, ℈j;
Sulphuris præcipitati, ʒj;
Vaselini, ℥j.—M.
Sig. Rub in thoroughly.

Psoriasis of the palms and soles may be treated satisfactorily with the compound salicylated soap plaster and by plasters and pigments of chrysarobin and salicylic acid.

## Pityriasis Maculata et Circinata.

This disease, known also as pityriasis rosea, is characterized by macular or circinate lesions, occurring mostly on the trunk. It is said

that fever usually precedes the appearance of the eruption, but I have not observed this. According to Brocq, there is a single patch which makes its appearance about the waist, neck, or arm, antedating the general eruption from four to fifteen days. The eruption consists at first of rosy-red spots, which later become brownish. The lesions are round, but, owing to their tendency to recover in the centre and to extend peripherally, gyrate and irregular figures are formed. Infiltration of the skin is so slight as to be hardly discerned. Furfuraceous desquamation is a marked feature. Vidal has asserted the parasitic nature of the affection, but this has not been confirmed.

In the treatment internal remedies are not required. Itching may be relieved by the use of the zinc-and-calamine lotion to which carbolic acid has been added:

℞. Zinci oxidi, ℥ss;
Pulv. calaminæ præparat., ℈iv;
Glycerini, ℥j;
Acidi carbolici, ℥ss;
Liquor. calcis, ℥vij.—M.
Sig. Shake well before using.

Ointments of sulphur and boric acid have been recommended. The most useful remedy in my hands has been as follows:

℞. Acidi salicylici, gr. x–xx;
Collodii flex., ℥j.—M.
Sig. Apply with a camel's-hair pencil.

### Dermatitis Exfoliativa.

As a matter of convenience, exfoliative dermatitis may be defined as an acute or chronic, general or partial, inflammation of the skin, in which the epidermis is shed more or less freely in large or small scales. The following clinical forms represent the types of disease in question:

**Relapsing Scarlatiniform Erythema.**—This affection is most frequent in children and young adults. After a prodromic period of several days, during which the patient complains of general malaise, there appears a diffuse erythema of the skin, occurring first on the trunk, which in a few hours or days involves the whole body. After a period of several days the skin is shed in flakes, this desquamation lasting in turn for a term of days. After the first few days the patient feels quite well again, and so remains till the subsequent attack. Relapses are said to be frequent, although they become progressively milder.

**Acute Exfoliative Dermatitis.**—Although often primary, this disorder may follow generalized psoriasis, eczema, or lichen. The

eruption is usually ushered in with a chill, followed by fever and systemic disturbance. The involvement of the skin is at first partial, but soon becomes universal. The skin is at first free from scales, and may be bright red, violaceous, or of a dusky hue. There is some degree of pruritus. In a few days the cuticle begins to desquamate in large or small, thin, papery scales. The character of the desquamation is influenced by situation: on the scalp it is furfuraceous, on the body and upper portions of the extremities the scales are generally large and more or less imbricated, while from the hands and feet I have seen the epidermis shed in great, thick, glove-like pieces. The hair is shed in the course of the disease, sometimes even the beard, eyelashes and pubic growth; the nails are also lost. The mucous membranes may also participate in the general process. Some cases are complicated by an ephemeral eruption of vesicles, blebs, or pustules. In severe cases the general state of the patient may excite much apprehension, either from the extreme emaciation and debility present or from the existence of serious complications. The affection may last from two or three weeks to as many months. Undoubtedly, there are much milder grades of exfoliative dermatitis than the one just described. There are also local forms.

**Pityriasis Rubra.**—According to Hebra and others, pityriasis rubra is a disease *sui generis*. As in the acute form, the disorder begins in one or more localized patches. These coalesce and gradually invade the whole body. The skin may be of a dark or vivid red or bluish-red. The desquamation is very free; the scales are thin and papery on the general surface, imbricated, and from a line to an inch or more in diameter. When the integument is freed from the scales it has a shining, tense appearance. The skin is not infiltrated as a rule, and there is no moisture. There may be œdema of the lower limbs. Alopecia and exfoliation of the nails also occur. The patient complains but little of itching, but his skin feels too small, and he is apt to be chilly even in the warmest weather. Febrile exacerbations occur now and again. The disease lasts months or years; there is generally a fatal termination, either due to progressive emaciation and consequent exhaustion, or else the patient is carried off by some intercurrent affection.

**Dermatitis Exfoliativa Infantum.**—This is a severe form of exfoliative inflammation of the skin, usually unattended by fever, which begins between the second and fifth weeks of life. About 50 per cent. of those attacked succumb to marasmus. The writer has met with two cases in St. Louis, both ending fatally.

The treatment of these various forms of exfoliative dermatitis is unsatisfactory. The general treatment is necessarily symptomatic. The acute form is best treated with diaphoretics—*e. g.*, pilocarpine—and diuretics. Quinine in full doses is also valuable. The writer has

obtained no benefit from drugs in pityriasis rubra. Ten drops each of fluid extract of ergot and tincture of iron may be tried. Arsenic does more harm than good. Locally, the use of soothing ointments and lotions is indicated. Inunctions of carbolized vaseline are grateful to the patient, and the application of the linimentum calcis on soft rags is often of great service so far as the alleviation of local symptoms is concerned.

Crocker thinks well of the following:

℞. Calaminæ, ℈ij;
Zinci oxidi, ʒss;
Olei olivæ,
Liquor. calcis, āā. ʒj.—M.
Sig. For local use.

Warm alkaline baths often do good in the way of removing crusts, etc., but sometimes seem to disagree. Rest in bed is necessary in chronic cases.

## Lichen Planus.

The eruption of lichen planus is made up of papules that are broad and angular at the base, flat and apparently glazed on the summit, slightly umbilicated, and of a dull purplish-red color. The lesions are usually symmetrically disposed. Any part of the body may be attacked, with the probable exception of the face, but the sites of predilection are the flexor sides of the forearms, about the wrists, the flanks, around the waist, and the knees and calves, and also on the mucous membranes. The papules may remain discrete, or coalesce to form groups, bands, or lines. Itching may be slight or severe.

A great many writers regard lichen planus as identical with lichen ruber, being merely a less severe form of the latter; but this opinion is by no means generally accepted. Lichen planus is met with more frequently in females than males, and is more common in adult life than in childhood, Often no exciting cause may be made out; at other times the disease would seem to be connected with gastric or uterine derangements, rheumatism, or other disturbances of the general system.

As regards internal treatment, the patient's condition should be thoroughly investigated, and any defects of health remedied when possible. Arsenic is sometimes very useful, but again, in some cases, it seems utterly valueless. Hutchinson reports a cure in which ¼ grain of tartarized antimony and 12 drops of nepenthe every four hours resulted in a rapid cure. Jamieson also thinks well of antimony in lichen planus. Small doses of bichloride of mercury have been given with success.

Locally, in acute cases, in which there is considerable involvement of the skin, alkaline baths and soothing lotions are demanded. The calamine-and-zinc lotion, with 10 minims of liquor carbonis detergens to the ounce, is admirable for the itching.

Stimulating treatment is required in chronic cases. Wilson was in the habit of prescribing a bichloride-of-mercury lotion of 2 grains to the ounce, and also the solution of Vleminckx[1] variously diluted. Unna speaks well of the following salve, with which the patient should be rubbed twice a day, being kept in bed in the mean time:

℞. Hydrargyri chloridi corros., gr. ij–v;
Acidi carbolici, gr. x–xx;
Ung. zinci oxidi, ʒj.—M.

A pigment of salicylic acid and chrysarobin is satisfactory in localized patches:

℞. Chrysarobini, gr. xx;
Acidi salicylici, gr. xx;
Traumaticini, ʒj.—M.
Sig. Paint on eruption with camel's-hair pencil.

Tincture of green soap with tar is also valuable. Piffard's formula, somewhat modified, is as follows:

℞. Saponis olivæ præp., ʒiv;
Olei rusci,
Glycerini, āā. ʒj;
Olei rosmarini, ʒiss;
Alcoholis, q. s. ad ʒviij.—M.
Sig. Rub in with a piece of flannel.

A lotion of zinc and sulphuret of potassium is often of decided advantage:

℞. Zinci oxidi,
Zinci sulphatis,
Potassæ sulphuratæ, āā. ʒij;
Aquæ rosæ, ʒiv.—M.
Sig. Mop on for five or ten minutes twice a day.

Lassar's treatment consists in lightly touching the tops of the papules for a fraction of a second with the finely-bent end of a galvano-

[1] See formula under Acne.

caustic wire or with the point of a Pacquelin cautery. For the after-treatment any indifferent powder will suffice. Most satisfactory results are claimed for this procedure.

### Lichen Ruber.

Lichen ruber, also called lichen ruber acuminatus, is a very rare disease in this country. The eruption consists, in the beginning, of discrete miliary papules, but as the disease advances the lesions run together, and finally form continuous patches that are red, infiltrated, and scaling. The whole surface may eventually become involved. The nutrition of the hair and nails also suffers.

Hebra lost all of his first cases, but when he began to use arsenic in large doses the prognosis was less gloomy. Fowler's solution may be given internally in gradually increasing doses, or, according to Köbner, the drug may be administered hypodermically with better effect. Alkaline diuretics, general tonics, and antimony may also be tried. The local treatment consists in soothing and antipruritic preparations and alkaline baths. The greatly thickened epidermis on the palms and soles may be removed with salicylated soap plaster. (See Eczema.)

### Eczema.

Eczema is an acute or chronic, non-contagious, inflammatory disease of the skin, characterized by multiformity of lesion, and the presence, in varying degrees, of itching, infiltration, and discharge. The secondary changes are also varied, and include crusting, fissuring, leathery infiltration, scaling, etc. Redness of the skin, the result of active, or even passive, hyperæmia, is a never-failing characteristic of the disease. It may be looked upon as the initial stage of eczema, and sometimes subsides without further changes. This redness does not occupy sharply-defined areas, but shades off insensibly into the surrounding unaffected skin.

According to the degree and extent of the inflammation, the exudation may be sufficiently great to remove the upper layer of the cuticle and gain access to the free surface in the form of a discharge, without the previous existence of vesicles or papules. Under other circumstances, especially if the congestion is most intense around the follicles, pointed red papules make their appearance, or, if a less plastic and more abundant exudation occurs, the epidermis is raised and vesicles are formed; or, again, as the result of a more persistent irritation or in subjects of a strumous habit, pustules will make their appearance. These lesions may rapidly disappear, leaving a dry scaling surface, or the wall of the vesicles and pustules may rupture and give rise to a serous or purulent discharge, which dries in crusts

and scales. Desquamation is the final stage of an eczema, and it may supervene not only on the forms last described, but follow a purely erythematous inflammation. Another objective symptom of great importance is thickening or infiltration. This symptom is always present, and although in recent and superficial forms of the disease it may be appreciable only by comparing the involved region with the healthy skin, when the eczema has extended and become chronic the infiltration may include the whole thickness of the derma and the fatty layer. So long as any of this thickening continues the eczema is not cured, the itching will continue, and the disease will be apt to return with renewed intensity. In certain situations, such as about the joints and on the palms and soles, owing to the infiltration of the skin and its consequent inelasticity, painful cracks and fissures are often observed. Itching, burning, and a feeling of rawness are the principal subjective symptoms; in fact, eczema is the itching disease *par excellence.*

Eczema may have its origin in a great variety of causes. It would seem that the primary condition is a specially vulnerable and susceptible cutaneous system, and that under given circumstances the disease may be evoked by any irritant, external or internal, which may arouse this latent susceptibility. Consequently, we find that heat and cold, chemicals, bad soap, rough under-clothing, etc. among local agencies, and that gout, rheumatism, malaria, pregnancy, lactation, nervous exhaustion, etc. among internal causes, may at one time or another be the direct or indirect etiological factors in the production of the disease.

It has been thought of late that eczema is a parasitic disease (Unna), but, whatever view may be held as to the nature of the affection, it is of vital importance, therapeutically, to take fully into account, as has just been stated, that it may be brought into existence by a multiplicity of external and internal exciting causes.

There is no risk involved in curing an eczema as speedily as possible, as an abundant experience has demonstrated that the humoralistic doctrine of the danger of suppressing "critical discharges" is without foundation.

The eczematous subject should avoid all irritants, external and internal. The food should be nutritious, but unstimulating. Fried articles, pastry, cheese, pickles, oatmeal, rich gravies, and sweets generally should be avoided. Tobacco and alcohol usually do harm. Tea must be given up and coffee drunk very sparingly.

There are no specifics for eczema: the internal treatment must of necessity be symptomatic. A searching examination must be made in each case for any obvious derangements of the health, and such complications should be removed when possible. The old plan of active purgation is not to be recommended, but as constipation is one of the

most frequent derangements that are met with in eczematous persons, attention should be directed to its relief. Ordinarily, the well-known hygienic measures—regularity at stool, the drinking of water in sufficient quantity between meals, etc.—are all that are required, but in more obstinate cases recourse may be had to various tonic laxative remedies. Among the latter the pill of aloin, strychnine, and belladonna is very useful, as are also appropriate doses of cascara sagrada or rhamnus frangula.

In acute eczema more decided laxatives are required. The well-known mistura ferri acida is valuable:

℞. Magnesii sulphatis, ℥j;
Ferri sulphatis, gr. iv;
Sodii chloridi, ℥ss;
Acidi sulphurici diluti, ℥ij;
Infus. quassiæ, q. s. ad ℥iv.—M.
Sig. A table-spoonful in a goblet of water half an hour before breakfast.

A full dose of blue mass, followed by a saline, is often of real service at the outset of an attack, or two compound cathartic pills may be taken. Syrup of rhubarb, with or without magnesia, is a good aperient for children. In all cases the urine should be carefully examined, and the oxaluria, lithæmia, or diabetes, if discovered, should be appropriately treated. When dyspepsia exists, its relief is imperatively demanded. The usual remedies, such as the mineral acids, pepsin, the alkalies, etc., may be prescribed on general principles.

Erythematous eczema of the face, associated with catarrh or dilatation of the stomach, is best treated by washing out that organ.

Alkalies are much used by Bulkley, especially when the urinary secretion is scanty:

℞. Potassii acetatis, ℥iv;
Tinct. nucis vomicæ, ℥ij;
Infus. quassiæ, q. s. ad ℥iv.—M.
Sig. A tea-spoonful in wine-glassful of water after meals.

Gouty patients will require alkalies and colchicum. If a rheumatic element is present, the appropriate treatment must be instituted. The strumous and anæmic must be prescribed for according to their necessities. Iron is a sovereign remedy for delicate children, and the syrup of the iodide is one of the best preparations. Moreover, in children, particularly those suffering from pustular eczema, cod-liver oil is indispensable. The most striking results are obtained from it in dispensary practice. (See formula under Acne.)

There are certain other remedies that are administered in eczema, in a more or less routine way, in the belief that they have an especial effect on the disease. Arsenic, at least, has been regarded as almost specific in its action. While not disputing the efficacy of this drug in a small number of cases, most dermatologists would deny to it anything like a specific effect, and would limit its range of employment quite sharply. It should never be given in acute attacks, and in even chronic cases great good cannot always be expected from its administration. Its chief value is in the dry, scaly forms of eczema and in affections of the nails. The drug is best given in the form of Fowler's solution combined with some preparation of iron:

℞. Liq. potassii arsenitis, ʒj–ij;
Vini ferri, ℥iv.—M.
Sig. A tea-spoonful in a wine-glassful of water directly after meals.

℞. Liq. potassii arsenitis, ʒj–ij;
Syr. mangani phosphatis comp., ℥iv.—M.
Sig. A tea-spoonful in water after meals.

Arsenic should always be given immediately after meals, and more good can be obtained from small doses than from large. The initial dose for an adult may be 2 minims, gradually increased, if necessary, up to 5 minims, but beyond this it is not advisable to go. Of late years Mr. Malcolm Morris of London has revived the use of wine of antimony in acute eczema. It should be given in about 5-minim doses three times a day.

Dr. Crocker recommends turpentine internally in uncomplicated cases when there is no alimentary irritation. It should be given in emulsion in the dose of 10 minims three times a day after meals, but this quantity may be increased by 5 minims at a time till 20 or 30 minims are reached; at the same time, as a diluent, the patient should take as much as a quart of barley-water a day. The same writer has tried the effect of counter-irritation in frequently-recurring eczema. If the disease affected the upper half of the body, it was used at the nape of the neck; if the lower half, it was applied over the lumbar region. The counter-irritant advised is either dry heat, a mustard-leaf, or liquor epispasticus.

While, as a general thing, local treatment affords us the best means against the intolerable pruritus of eczema, there are cases, especially of widespread disease in elderly people, in which such measures are ineffectual, and we are obliged to try one expedient after another.

The preparations of opium are inadmissible, as they increase the cutaneous irritation, and when it is necessary to procure sleep it is

better to give chloral, sulphonal, and similar preparations. The elixir of valerianate of ammonium is quite useful in nervous and hysterical patients. There would be little difficulty, however, in procuring sleep if the itching could be allayed. A number of preparations may be tried for this purpose. Bulkley speaks well of gelsemium given at first in 10-drop doses, repeated and increased every half hour until the patient is relieved or until physiological symptoms are experienced. Wine of antimony sometimes does very well. Pilocarpine by the mouth or hypodermically is worth trying in suitable cases. The late Hilton Fagge recommended quinine to allay itching. Dr. Pye-Smith says that it is particularly useful in children, $\frac{1}{2}$ a grain being given to a child of one year an hour before bedtime, 1 grain if two years or older, and as much as 5 grains at the age of fifteen.

The local treatment of eczema is of paramount importance. Although there are a great many remedies which may be used with more or less success in the local treatment of eczema, the principles underlying their application are comparatively simple. According to the stage in which the eczema happens to be will rest or stimulation be demanded. By rest is meant something more than the usual surgical import of the word: it means, in the sense we use it, freedom from all sources of possible irritation; for example, not only immobilization of a part, but exclusion of air, the discontinuance of the irritating effects of soap and water, the use of fixed dressings, and, most important of all, relief of pruritus, so that the patient is not constantly tempted to disturb the affected surface by scratching. On the other hand, in cases of a more chronic character, when the skin is greatly infiltrated, the object of treatment is to cause resorption of effused material by stimulating remedies, or sometimes, indeed, by using very active local stimulants to induce an acute and more manageable affection in place of a chronic and intractable one.

In order, however, to determine more accurately the pathological state of the skin, and to prepare it properly for the reception of the appropriate remedy, it is an absolute essential that the parts be freed from scales, crusts, and other secondary products. For the removal of crusts repeated soakings in a bland oil are much preferable to poultices. Occasionally it is allowable to use a strong detersive soap, such as Bagoe's olive soap, but as a general thing the rule never to wash an eczema is to be respected. So soon as the stage of the disease has been determined, whether acute, subacute, or chronic, and all the other features of the case have been fully considered—such, for example, as the age of the patient, the length of time the eczema has existed, and also the seat of the complaint—the question will then arise as to what form of local treatment will prove of most service.

The proper answer to this question often makes the difference between success and failure. I shall therefore now describe, somewhat in detail, the various topical preparations that are used in eczema, specifying the conditions to which they are applicable, and after doing this the clinical features and special therapeutics of eczema as it affects the various regions of the body will receive attention.

Lotions.—According to circumstances lotions may be soothing, drying, astringent, or stimulating. They should rarely be used in the hair or where there is much discharge, and, except in the early stage of acute vesicular eczema, their principal rôle is in the erythematous and papular varieties of the disease. When acute inflammation is present the lotion should be kept constantly renewed; under other conditions it serves its purpose best by being mopped on occasionally and allowed to dry. In acute eczema the inflammatory symptoms may be greatly allayed by the use of sedative and slightly astringent lotions, such as the following:

℞. Tinct. opii,
Liq. plumbi subacetatis, *āā.* f℥ij;
Aquæ, f℥iv.—M.

Dr. Taylor recommends the following:

℞. Liq. plumbi subacetatis, f℥ij;
Tinct. opii, f℥ij;
Spirit. camphoræ, f℥j;
Glycerini, f℥ij.—M.
Sig. To be mixed with a quart of water and applied on lint.

When extensive surfaces are involved Carron oil is valuable and inexpensive; it may be employed as follows:

℞. Linimenti calcis, f℥vj;
Creasoti, ♏vj.—M.
Sig. Apply on strips of cloth.

Black wash is employed by many dermatologists in acute eczema, and is highly praised by Dr. J. C. White of Boston. He directs that the wash, of full strength or diluted one half with lime-water, be mopped on for ten or fifteen minutes at a time, the sediment being allowed to dry; afterward a little zinc salve should be gently smeared over the surface with the finger. This procedure may be repeated every few hours.

A favorite preparation in acute vesicular eczema is the well-known Startin's lotion:

℞. Zinci oxidi, ℥ss;
Pulv. calaminæ præparat., ℈iv;
Glycerini, f℥j;
Liquor. calcis, f℥vij.—M.
Sig. Shake well before applying.

Cheese-cloth cut in strips may be dipped into this and bound on the parts with a roller. The cloths should be kept constantly wet. When merely a drying effect is desired, it may be mopped or painted on, and allowed to form a protective coating. Among other similar preparations may be mentioned grindelia robusta, 1 or 2 drachms to 4 or 8 ounces of water.

A drying lotion much used by English physicians is composed of nitrate of silver, 16 grains, and sweet spirit of nitre, 1 ounce. It may be used on circumscribed patches of a subacute or chronic type and in the form of the disease occurring between the toes and about the mammæ (Liveing). Lotions of carbolic acid are of inestimable value in eczema:

℞. Acidi carbolici, ℥j–iv;
Glycerini, f℥j;
Aquæ destillatæ, q. s. ad Oj.—M.

This preparation is rarely indicated in acute cases, except of the papular form, but in the subacute and chronic stages there is nothing that will act so beneficially in allaying the pruritus. It may be mopped on with a rag, or, where an extensive surface is involved and the skin is unbroken, it is best sprayed on with an atomizer.

Hutchinson's lotion is also soothing and antipruritic:

℞. Liq. plumbi subacetatis, f℥ss;
Liq. carbonis detergentis, f℥iiss.—M.
Sig. One tea-spoonful mixed with a pint of water.

For limited patches a somewhat different formula may be employed:

℞. Acidi carbolici, f℥ij;
Glycerini, f℥ss;
Olei rosæ, ♏ij;
Alcoholis, q. s. ad f℥viij.—M.

Carbolic acid or liquor carbonis detergens may also be added with advantage to the zinc-and-calamine lotion, in the strength of 1 drachm to the pint.

Stimulating lotions are demanded in chronic, thickened eczemas.

One of the most valuable is Hebra's spiritus saponatus kalinus, made of 2 parts of green soap and 1 of alcohol. This should be thoroughly rubbed in with a piece of flannel, then washed off, the parts dried, and the surface protected with diachylon ointment spread on cloth. Tar may be added to the green-soap lotion, as follows:

℞. Picis liquidæ,
Saponis olivæ præp.,
Alcoholis, āā. fʒij.—M.

A preparation much prized by Bulkley is called by him "liquor picis alkalinus:"

℞. Picis liquidæ, fʒij;
Potassæ, ʒj;
Aquæ, fʒv.—M.

This may be used as an antipruritic lotion of the strength of from 1 to 4 drachms to the pint of water, or may be rubbed into localized infiltrated patches in full strength. It also mixes well with an ointment base.

According to the necessities of the case, lotions containing various proportions of salicylic acid, sulphate of zinc, sulphur, thymol, etc. may be employed, and if still more decided stimulation is required we may use strong solutions of caustic potash; but of late years, and especially since the introduction of salicylic acid into practice, this procedure has been less employed.

Powders.—Various substances in powder form may be used in eczema, but their range of application is not very great as compared with other modes of treatment. They are indicated in acute erythematous eczema extending over the greater part of the body, in subacute conditions when there is little or no secretion, and as driers and protectives in intertrigo. Sometimes, however, powders are better borne in acute vesicular eczema than anything else. Powders may often be used in the day, the salve or other preparation being employed at night. Powders are usually composed of lycopodium, oxide of zinc, bismuth, cimolite, boric acid, iodoform, iodol, corn starch, and the useful terra silicea. They may be dusted on the skin directly with a powder-puff or shaken from muslin or cambric bags, or, as suggested by Unna, they may be put into long quilted bags for permanent application to a part. Anderson's antipruritic powder is well known:

℞. Pulv. amyli, ʒvj;
Zinci oxidi, ʒiss;
Pulv. camphoræ, ʒss.—M.

Another powder found serviceable in erythematous eczema about the scrotum, between the toes, and under the breasts is the following:

℞. Thymol., gr. j;
Pulv. zinci oleatis, ʒj.—M.

Ointments.—Most cases of eczema as seen in practice are best treated by ointments. They are particularly indicated in the stage of the disease exhibiting exudation and crusting, although, as will be seen presently, salves are also of great service in scaly and infiltrated eczemas.

One of the most commonly prescribed ointments is the benzoated oxide-of-zinc preparation of Wilson. To increase its sedative action 1 drachm of the dilute solution of the subacetate of lead may be added to each ounce, and to render it antipruritic the same quantity of spirit of camphor may be incorporated. The unguentum aquæ rosæ—which, moreover, is one of the most valuable ointment bases—is very cooling to the inflamed skin, and it may also be rendered mildly astringent by adding to it oxide or carbonate of zinc in the proportion of 1 drachm to the ounce. Other formulæ are as follows:

℞. Zinci carbonatis, ʒj;
Acidi salicylici, gr. x;
Vaselini, ʒj;
Ung. aquæ rosæ, ʒj.—M.
*Jamieson.*

℞. Bismuthi oxidi, gr. xv;
Acidi oleici, ʒij;
Ceræ albæ, ʒiss;
Vaselini, ʒivss;
Olei rosæ, ♏j.—M.
*Anderson.*

℞. Glycerol. plumbi subacetatis (Squire), fʒj;
Ung. aquæ rosæ, ʒj;
Ceræ albæ, q. s.—M.

℞. Bismuthi subnitratis, ʒj;
Ung. aquæ rosæ, ʒj.—M.

℞. Bismuthi subnitratis, ʒiv;
Pulv. zinci oxidi, ʒss;
Acidi carbolici, ʒss;
Vaselini, ʒij.—M.
*Macintosh.*

Lanolin, combined with 20 per cent. of cold cream, furnishes a tenacious and soothing unguent to the skin, and is useful in that form of eczema formerly called pityriasis simplex. One of the most universally applicable and valuable ointments is the unguentum diachylon of Hebra. Owing to the difficulty of preparing it after the original formula, which contained olive or linseed oil, it is now generally made by melting together equal parts by weight of lead plaster and vaseline. It should be neatly and evenly spread on strips of cotton cloth and fastened to the parts with a roller bandage. The advantages of this method of applying ointments cannot be overestimated, since the salve adheres to the cloth, and not to the skin, thereby allowing inspection of the surface at any time, and the additional use of other remedies, such as carbolic-acid lotion, to the affected region, besides utilizing the element of firm but gentle pressure. Another preparation of special value, especially in the eczema of children, is the following:

℞. Zinci oxidi, ʒj;
Ung. picis liq.,
Ung. aquæ rosæ, āā. ʒij;
Lanolini, ʒiv.—M.
Sig. Spread on lint.

It will be observed that the amount of tar in this prescription is quite small, the object being to employ a quantity just sufficient to allay pruritus, and not to obtain the full stimulating properties of the drug. The various preparations of tar are of great advantage in eczema; but it should be remembered that in whatever form tar may be used, whether pure, in alcoholic solution, or in ointment, it is a remedy that cuts both ways. It should always be applied tentatively in the beginning, and as a general thing reserved for the squamous forms of the disease. Oil of birch may be prescribed as follows:

℞. Olei rusci, ʒj–ij;
Ung. aquæ rosæ, ℥j.—M.

To be effectual in cases that require it a tar ointment should be thoroughly worked into the skin, at least two inunctions being made in the course of twenty-four hours.

Among numerous other substances advantageously made use of in the form of ointment for the treatment of eczema may be mentioned carbolic acid, salicylic acid, tannin, sulphur, and mercury.

The mercurial preparations are of great value, but, owing to liability of absorption, they must be handled with caution and applied to limited surfaces at a time. Duhring speaks well of calomel in the

strength of ½ to 1 drachm to the ounce. Niemeyer extolled the virtues of white precipitate, which may be used in the strength of from 20 to 60 grains to the ounce, or combined with tar, as in the following prescription:

℞. Hydrargyri ammoniati, ℥ss;
Liq. picis alkalin., f℥j;
Ung. aquæ rosæ, ℥j.—M.

Plasters.—Among the more valuable preparations of this class are undoubtedly the plaster and salve mulls of Unna. The salve mulls are made by incorporating the desired remedy (zinc oxide, lead, mercury, etc.) with a base made usually of benzoated suet and lard, and spread on one or both sides of undressed muslin. The plaster mulls are made of gutta-percha faced with some adhesive substance containing the medicament, and backed with muslin. The dressings first mentioned, especially the diachylon mull, are useful in subacute eczema, but in acute cases they do not answer so well. The plaster mulls are of value in various forms of chronic eczema, the salicylic-acid plaster mull doing excellent service in deeply infiltrated patches on the hands and feet. Within the past few years it has been found practicable to replace, in many instances, these expensive preparations with the salicylated soap plaster devised by Pick:

℞. Emplast. saponis liq., ℥iiss;
Olei olivæ, ℥v;
Acidi salicylici, gr. xxxvii.—M.
Sig. Apply on strips of muslin.

Slightly changing the above, and taking advantage of Klotz's modification, the following formula has been found of much service in all forms of infiltrated eczema:

℞. Emplast. plumbi, ℥xxv;
Pulv. saponis, ℈iv;
Aquæ, q. s.;
Vaselini, ℥v.;
Camphoræ, gr. xx;
Acidi salicylici, ℈v.—M.
Sig. Spread on muslin.

When necessary the percentage of salicylic acid may be increased.

Pastes.—These preparations may often be used where an ointment proves irritating or otherwise unsuitable; and, besides, they provide an

adhesive and protective dressing that is of the greatest utility in many cases. There are many formulæ for these pastes (gum, dextrin, kaolin, lead, and glycerin), but in the treatment of eczema the following are the most generally applicable. The best is undoubtedly that of Lassar:

℞. Acidi salicylici, ʒss;
Zinci oxidi,
Amyli, āā. ʒvj;
Vaselini, ʒij.—M.

This paste may be spread on strips of muslin, or, in more chronic and scaly patches, directly rubbed on with the finger. Fox advises the addition of 5 per cent. of oil of cade to the above when more stimulation is demanded. The same authority recommends corn starch and bismuth in the place of the oxide of zinc and starch in the formula just given. Ihle's modification of Lassar's paste is made in this way:

℞. Resorcini, gr. x–ʒj;
Lanolini,
Vaselini,
Zinci oxidi,
Pulv. amyli, āā. ʒij.—M.

When the surface affected is extensive, Unna's oxide-of-zinc paste offers special advantages:

℞. Zinci oxidi, ʒj;
Mucilaginis acaciæ,
Glycerini, āā. fʒij.—M.
Sig. Apply with a brush several times a day.

If the itching is severe, 1 per cent. of carbolic acid may be added. Sometimes glycerin disagrees, and oil of sweet almonds is a less irritating menstruum.

Quite recently several new formulæ for pastes have been introduced. The bassorin paste of Dr. Elliot[1] is made as follows:

℞. Bassorin., ʒx;
Dextrin., ʒvj;
Glycerini, fʒij;
Aquæ, q. s. ad fʒxxvss.—M.
Prepare cold.

Very similar to this is the linimentum exsiccans of Professor Pick:

[1] Personal communication.

| | | |
|---|---|---|
| ℞. | Tragacanthæ, | gr. lxxv ; |
| | Glycerini, | ♏xxx ; |
| | Aquæ, | f℥xxvss.—M. |

Both of these preparations may be used as excipients for other drugs—viz. salicylic acid, resorcin, oxide of zinc, etc.—and in the superficial forms of eczema, especially of the erythematous and papular types, their use is very beneficial. When there is much exudation or great infiltration they are inadmissible. A most excellent and widely useful combination is 10 per cent. of oxide of zinc and 1 per cent. of carbolic acid added to the linimentum exsiccans.

Glycerin Jelly.—Pick was the first to suggest gelatin as a vehicle for various remedies in cutaneous practice. Glycerin jelly may be used in the same manner and in the same class of cases as the pastes last mentioned ; but it has the disadvantage of being more difficult to prepare and apply :

| | | |
|---|---|---|
| ℞. | Gelatinæ, | ʒiv ; |
| | Zinci oxidi, | ʒiiss ; |
| | Glycerini, | f℥ss ; |
| | Aquæ, | f℥vj.—M. |

Heat the water, dissolve the gelatin in it, then add the glycerin and zinc, and stir till cold. Before using, the jelly is melted by gentle heat in a water-bath and applied with a soft brush.

Paints.—This variety of fixed dressing is made by adding tar, chrysarobin, salicylic acid, etc. to collodion or traumaticin. In eczema about the mouths of children, for example, tar may be employed after the following formula :

| | | |
|---|---|---|
| ℞. | Ol. rusci, | f℥j ; |
| | Collodii, | |
| | *vel* traumaticini, | f℥j.—M. |

Sig. Apply with camel's-hair pencil.

Baths.—Baths have largely gone out of fashion in skin diseases of late years, and in eczematous affections, with the exception, perhaps, of an occasional alkaline bath in generalized papular eczema, they are now but infrequently prescribed. Sea-bathing is usually injurious in acute eczema, but sometimes in chronic localized patches the general tonic effect is beneficial ; and the same holds good for the many and much-vaunted mineral and thermal springs.

Mechanical Appliances and Methods.—Massage occasionally acts well in deeply-infiltrated eczema, and so does multiple puncture

and scarification in limited plaques. Support and compression with the rubber bandage are of especial value in suitable cases.

**Treatment of Local Forms of Eczema.**—ECZEMA OF THE SCALP.—The disease in this situation may take on the pustular, vesicular, or erythematous type. Usually when the case comes under observation the primary features have disappeared, and there are present only scattered greenish-yellow crusts, sometimes covering the head like a cap, or the surface is moist and exuding, or, finally, a chronic infiltrated, scaly, and very itchy state of the scalp is present. Pustular eczema of the head is most frequent in children, in whom, also, extension to the face and ears is of common occurrence. In both children and adults the first step necessary in the way of treatment is to remove crusts when present. As a rule, poultices should be avoided, using instead free inunctions of olive or cod-liver oil. In children there is no objection to clipping the hair, but in adults, especially women, this must be avoided. Stiff ointments should not be applied to hairy regions, but preparations having vaseline, oil, alcohol, glycerin, or water as excipients. The acute forms of eczema should be soothed, and for this purpose may be prescribed oil of almonds or sweet oil containing 1 per cent. of carbolic or salicylic acid, or a lotion of black wash mopped on for few minutes at a time, followed by reapplication of the oil or an ointment composed of 1 drachm of bismuth subnitrate to the ounce of vaseline. After the subsidence of the inflammatory symptoms, or if when first seen the case is subacute, a tar-and-zinc salve will give much satisfaction:

| | |
|---|---|
| ℞. Ung. picis liq., | ʒj–ij; |
| Ung. aquæ rosæ, | ʒj; |
| Zinci oxidi, | ʒj.—M. |

In babies with but little or no hair on the head unguentum vaselini plumbicum may be used in the same way. Both calomel and white precipitate ointments, if used cautiously and over a limited area, are valuable remedies. The scalp, however, bears tar exceptionally well, and in most cases of this sort it may be applied in the shape of an oil:

| | |
|---|---|
| ℞. Olei rusci, | fʒj; |
| Olei amygdalæ, | fʒj.—M., |

or in combination with alcohol:

| | |
|---|---|
| ℞. Olei rusci, | fʒj; |
| Glycerini, | fʒj; |
| Alcoholis, | fʒvj; |
| Olei rosæ, | q. s.—M. |

Somewhat pleasanter and more efficient in chronic scaly eczema of the scalp is an ointment of salicylic acid and sulphur:

℞. Acidi salicylici, ℈j;
Sulphuris præcipitati, ʒj;
Vaselini, ℥j;
Olei rosæ, q. s.—M.

This should be thoroughly worked into the scalp, and not merely smeared over the hair, once or twice a day. When an eczema is set up by the presence of pediculi, it is obvious that these must be destroyed. The best remedy for this purpose is petroleum, which should be applied over night and washed out in the morning with hot soapsuds, and followed by a soothing ointment. Ointments applied to the scalp should be held in position by a well-fitting linen cap.

Eczema of the Face.—Any variety of eczema may occur on the face. The pustular, vesicular, and papular forms are most frequent in children, the erythematous in adults. Eczema erythematosum is particularly prone to attack persons in middle and advanced life, and is noted for its obstinacy and tendency to repeated recurrences.

In acute erythematous eczema of the face in adults the treatment must be of a soothing character, lotions being preferable:

℞. Zinci oxidi, ℥ss;
Pulv. calaminæ præparat., ℈iv;
Glycerini, ℥j;
Liquor. calcis, f℥vij.—M.

Or,

℞. Zinci oxidi, ℥ss;
Mucilag. acaciæ, f℥j;
Emuls. amygdalæ, f℥ij;
Aquæ rosæ, q. s. ad f℥iv.—M.

When the first mentioned is employed, it should be applied on cheese-cloth cut to fit the parts; the last-named preparation may be gently smeared on every few hours. If an ointment should seem to suit better, the unguentum vaselini plumbicum serves a good purpose, or one containing Squire's glycerole of lead:

℞. Glycerol. plumbi subacetatis, ʒss;
Ung. aquæ rosæ, ℥j;
Ceræ albæ, q. s.—M.

In these acute cases it is well to secure a tolerably free action of the bowels, employing for this purpose the mistura ferri acida. In cases

of a less inflammatory type, when there is moderate infiltration, the zinc-ichthyol gelatin is valuable, or the zinc-and-tar salve may be cautiously tried. As many patients are unwilling to wear ointments and lotions during the day, and in this lies the main difficulty of effecting a cure, the parts may be protected by Provan's paste:

℞. Tragacanth., Glycerini, *āā.* fʒiv; Sodii borat., ʒss; Aquæ destillatæ, q. s.—M.

This can be readily washed off at night. Powdered oleate of zinc may be dusted on with the same object. When the disease is limited to the forehead, the diachylon-salve mull may be constantly worn under the inner hat-band. Even in very chronic eczema of the face, frictions with green soap and strong preparations of tar are ill-borne; but the compound salicylic-acid plaster (previously described), neatly spread on muslin and snugly adjusted to the parts, is of great value. In children the crusts should be removed by inunctions with sweet oil or by applying at once the unguentum vaselini plumbicum spread on muslin strips. The latter ointment may be then continued, being renewed twice in the day—and in pustular eczema there is nothing better—or in somewhat moist or scaly patches the tar and zinc may be employed. As a rule, salves should be applied by means of muslin strips kept in place by a light skeleton mask. A very valuable remedy for children is Lassar's paste, either spread on muslin or in papular and scaly eczema merely smeared on with the finger. It dries to a thin adhesive powder, which allays itching, affords the needed protection, and is not readily scratched off. It is especially true of the eczema of children that the affected surfaces *must not be washed*, as thereby all the good accomplished by the appropriate remedy is sacrificed in a few minutes. Eczema about the mouth is quite difficult to heal, particularly in children, owing to the free movement of the parts and the irritating effects of nasal discharges, saliva, and the passage of food. It is here necessary to use a fixed dressing:

℞. Olei rusci, fʒj; Collodii (contractile) *seu* traumaticini, fʒj.—M.

Eczema of the Ears.—Eczema of the ears is more common, perhaps, in children with eczema of the head or face, but it also occurs in adults in the same connection or alone. The various forms of the disease are to be seen here. In acute eczema the ears are red, swollen, and tender; in the chronic type the parts are board-like, fissured, and scaling. Exacerbations and relapses are frequent. Acute and chronic

eczema of the external auditory meatus is common. The patient complains of deafness, pruritus, and a sense of fulness, and the canal becomes clogged with epithelial scales and cerumen.

In acute eczema of the auricle the usual soothing remedies are indicated, such as calamine-and-zinc lotion or oxide of zinc with almond emulsion. Ointments, owing to their facility of application, are also useful, especially in subacute and chronic cases. The best salve for the purpose is the modified diachylon, which should be spread on cloth and neatly applied to the affected parts. In the very persistent eczema found behind the ears of children a brisk application of green soap, followed by unguentum vaselini plumbicum, is especially useful. For relief of the itching a carbolic-acid lotion such as the following may be frequently mopped on:

| | |
|---|---|
| ℞. Acidi carbolici, | ʒij; |
| Glycerini, | fʒss; |
| Alcoholis, | fʒviiss.—M. |

Professor H. N. Spencer, the well-known otologist, has kindly prepared for me the following brief statement of the treatment he has in his large experience found most useful in the treatment of eczema of the auditory canal:

The local treatment should consist of soothing applications in the acute form, whereas in the chronic form of eczema the treatment requires to be stimulating. Water should not be used in either form. Accumulation in the canal, of whatever character it may be, is best removed by means of an absorbent cotton mop or the curette and angular forceps, providing always that the operator possesses the necessary patience and skill. Ointments, as a rule, constitute the most useful means of medication. Instead of being spread upon cloths, which are difficult of application, the ointment may be retained by means of plugs of absorbent cotton.

In acute eczema an oxide-of-zinc ointment compounded with cold cream (1 drachm to the ounce) is a valuable remedy; also the diachylon ointment of Hebra. The moist or exudative form of the disease, involving the inner third of the canal and where the drumhead has become implicated, will often yield to an 80-grain solution of nitrate of silver applied by the cotton-holder. If the desired result is not obtained promptly, however, this application should be discontinued, and an insufflation of boric-acid powder will sometimes succeed where the silver has failed.

In chronic desquamative eczema an alcoholic solution of resorcin, rubbed firmly in the part, and the oleum rusci, have proved valuable remedies.

Eczema of the Nares.—The disease here is often associated with chronic catarrh, and in children frequently follows in the wake of the exanthemata. It is to be distinguished from lupus and syphilis. The nose is often swollen and the nasal orifices almost closed with crusts. On removing the crusts the mucous membrane will be found reddened and congested, and sometimes the seat of considerable ulceration. A follicular eczema of the hairs within the nares is not uncommon in the adult, and is very persistent and gives rise to much suffering. Pustular eczema of the upper lip, in connection with eczema narium, is quite frequent. These cases require proper attention to the general health. Cod-liver oil and syrup of iodide of iron are serviceable in children; and as the follicular eczema of adults generally indicates debility, it must be treated accordingly. Locally, crusts should be removed by free inunction of olive oil, and subsequently a soothing and slightly astringent ointment applied.

℞. Glycerol. plumbi subacetatis, ʒj;
Ung. aquæ rosæ, ℥j.—M.

Unna recommends inserting into the nostrils small rolls of paper covered with zinc-and-red-precipitate salve mull. Diachylon-salve mull or diachylon ointment spread on muslin is a good application for eczema of the upper lip.

Eczema of the Lips.—The mucous surface of the lips is sometimes the seat of eczema. One or both lips may be affected and take on any of the forms of the disease, the exuding and squamous varieties being the most frequent.

As already stated, the cutaneous portion of the upper lip, in both children and adults, is often the seat of pustular eczema, and when the upper lip is covered with a mustache the affection is particularly obstinate.

The local treatment of the disease when it occupies the vermilion part of the lip is highly unsatisfactory. When acute, a soothing preparation like lanolin with 20 per cent. of cold cream may be tried; the oxide-of-zinc-and-almond emulsion frequently applied is very agreeable:

℞. Zinci oxidi, ℥ss;
Mucilag. acaciæ, ʒj;
Emuls. amygdalæ, f℥ij;
Aquæ rosæ, q. s. ad f℥iv.—M.

In squamous cases G. H. Fox recommends 5 grains of thymol to the ounce of cold cream. When there is much thickening solutions of

caustic potash, 20 grains to the ounce, may be employed. Van Harlingen speaks well of the following mixture of dilute phosphoric acid, which should be applied three times a day:

℞. Acidi phosphoric. dil.,
Glycerini,
Syrupi, āā. f℥ss.

Deep cracks may be healed by rapidly pressing into them a sharpened stick of nitrate of silver, and afterward painting the parts with the compound tincture of benzoin.

In pustular eczema of the upper lip it is important to treat any nasal discharge that may exist, and in the adult the hairs should be epilated. The best local application is diachylon ointment spread on muslin, or diachylon-salve mull. When the infiltration is considerable, it will be found necessary to exert pressure by means of a bandage, and to do this effectually a thin wedge of cork should be worn between the lip and teeth.

Eczema of the Eyelids.—Erythematous eczema of the eyelids is common, especially in connection with the same condition on the face generally. Eczema of the edges of the lids is particularly to be noted in strumous children, and may be associated with chronic conjunctivitis. It is really a pustular eczema, and usually presents all the symptoms of that disease. The most soothing applications are demanded for erythematous eczema of the general surfaces of the lids, even if there be in addition considerable thickening, as irritating remedies are but poorly tolerated. Equal parts of cold cream and zinc oinment will be found useful. For the disease at the edge of the lids epilation is often demanded, although mercurial preparations, and especially the yellow oxide, act exceedingly well, and may render epilation unnecessary:

℞. Hydrarg. oxidi flav., grs. ij–viij;
Vaselini, ℥j.—M.

Often this latter state is kept up by some ocular defect, and may be cured by the adjustment of proper glasses. In strumous children cod-liver oil and iron are urgently demanded, particularly as the disease often follows an attack of one of the eruptive fevers.

Eczema of the Beard.—The symptoms of eczema of the beard are similar to those observed in eczema of the scalp, the elementary forms being of the vesicular, erythematous, papular, or pustular type. Most of the cases, however, are pustular or squamous in character. The eczema, moreover, may extend from the hairy parts, wherein it differs from sycosis, and attack the adjacent non-hairy parts of the face and neck. In very acute pustular cases it will suffice to clip the beard

closely and apply soothing applications, such as salicylated or carbolized oil, equal parts of olive oil and lime-water, black wash, cold cream, lanolin, etc. After the more inflammatory symptoms have subsided frequent shaving is imperative, although the patient and the patient's barber will both declare it to be impossible. However, it can be done, and should be done, at least every second day, and immediately afterward the modified diachylon salve, spread evenly on muslin, should be applied, freshly-prepared cloths being reapplied morning and evening. When the disease is decidedly chronic more active measures still will be appropriate. In addition to the shaving, it is well first to epilate such hairs as are manifestly imbedded in pustules, and afterward to have recourse to stimulating salves and pastes. Under such circumstances Robinson's ointment serves a good purpose, as does also Lassar's paste:

℞. Ung. diachylon,
Ung. zinci oxidi, *āā.* ℥ss;
Ung. hydrarg. ammon., ʒiij;
Bismuthi subnit., ʒiss.—M.

Or the following may be used:

℞. Sulphuris præcip., ʒj;
Ung. aquæ rosæ, ℥j.—M.

For squamous eczema tar ointments are required, and the shaving should be continued:

℞. Olei rusci, ʒj;
Ung. aquæ rosæ, ℥j.—M.

There is great tendency to relapse in all forms of the disease, and it is therefore important to persevere with the treatment in a modified way for many months. A dusting powder of the oleate of zinc is very useful as a protective during the day after the necessity of employing the more active measures has passed away.

Eczema of the Breast and Nipple.—Eczema of the breast and nipple is most common in nursing-women, but it is also to be seen, although rarely, in virgins, and even in males. The mildest form is the "sore nipple," which consists of a superficial denudation of epithelium with some slight discharge, and when the parts are at rest of the formation of crusts. In severe cases the nipple is raw, swollen, and deeply fissured, or it may be sunken and the surrounding areola heavily incrusted. The eruption is generally arranged in a circle around the nipple, and may extend so as to involve the whole

breast. One or both nipples may be attacked. Mastitis is not an infrequent sequela. For the fissured nipples of nursing-women Veiel recommends borax ointment prepared after Lister's formula. After nursing the nipple is washed off with borax-water (1 : 25), and then covered with the borax salve spread on muslin. For the acute form of the disease the modified diachylon ointment answers well, or Unna's paste may be applied after the parts have been gently dried :

℞. Sacchari,
Zinci oxidi,
Mucilag. acaciæ,
Glycerini, āā. ʒj.—M.

Nipple-shields are of advantage. In women who are not nursing the green-soap-and-diachylon-ointment treatment is of the greatest value. Liveing has had success with a solution of nitrate of silver brushed over the surface.

Eczema of the Umbilicus.—Upon the umbilicus the disease presents itself usually as eczema rubrum. Umbilical eczema is not always easy to cure. Duhring suggests an ointment of oleate of zinc, 1 drachm to the ounce, with 15 to 30 grains of calomel. Boric-acid salve, used as in eczema of the nipple, is also valuable. Diachylon ointment spread on muslin, or the diachylon-salve mull, is useful.

Eczema of the Flexor Surfaces of the Joints.—The flexor surfaces are quite common seats of eczema, wherein the disease differs from psoriasis, which is always to be seen on the extensor surfaces. It is usually symmetrical, and is apt to assume the aspect of an eczema intertrigo, although the skin may become much infiltrated, fissured, and covered with scales. In the acute stage Lassar's paste is very efficient; in subacute conditions the tar-and-zinc salve may be employed to advantage; but when the disease has become chronic more decided stimulation is demanded, such as by tar or friction with green soap.

Eczema Intertrigo.—This occurs between the gluteal folds, in the axillæ and groins, under the breasts of women, and in fact wherever folds of skin come in close contact. It often begins as a simple erythema (erythema intertrigo) that has been allowed to go on without treatment. As a prophylactic, stout people especially should keep the parts freely dusted with some bland powder. After the disease has been established the affected surfaces should be washed as little as possible, and they should be kept apart by the interposition of lint or a thin layer of absorbent cotton. Dusting powders such as the following are generally of advantage :

℞. Thymol., gr. j ;
Pulv. zinci oleatis, ʒj.—M.

Or,

℞. Pulv. semen. lycopodii, ʒij ;
Zinci oxidi, ʒvj.—M.

Lassar's paste is of especial value ; in other instances a boric-acid salve (1 drachm to the ounce) and salicylic-acid ointment (15 grains to the ounce) may be tried.

Eczema of the Anus and Perineum.—Eczema of the anus and perineum often has an insidious beginning, and but rarely shows itself in the acute form. The anus alone may be the seat of the disease, or the perineum and genital organs may be simultaneously involved. Many of these cases are complicated with hæmorrhoids, which are often undoubtedly the principal etiological factors in the production of the eczema.

The treatment should be both internal and local. The diet should be regulated, smoking interdicted, and a regular action of the bowels maintained. For the latter purpose, in this condition, Bulkley recommends 1 or 2 tea-spoonfuls of cream of tartar and sulphur :

℞. Sulphuris præcipitati,
Potassii bitartratis, *āā.* ℥j.—M.

The same writer's method of employing hot water locally is of great value, since nothing relieves the itching so speedily. Before commencing the applications the salve that is to be worn in the intervals is spread on lint and made ready for use. For this purpose equal parts of tar ointment and cold cream, or cold cream and lanolin, may be prescribed :

℞. Ung. picis liq., ʒj ;
Ung. aquæ rosæ, ʒj ;
Lanolini, ʒvj.—M.

The patient is then directed to place between his feet a basin containing very hot water, into which he dips a soft handkerchief, that is immediately withdrawn and pressed in a mass against the affected surfaces for about one minute. Three or four minutes altogether are sufficient, and immediately afterward the parts are gently dried, and without loss of time the ointment put on. One drachm of calomel to the ounce of vaseline is also serviceable. In combination with the latter Liveing praises a bismuth ointment with morphine :

℞. Bismuthi nitratis, ʒij ;
Morphinæ hydrochloratis, gr. ij ;
Ung. aquæ rosæ, ℥j.—M.

The nitrate-of-silver solution painted over the eruption will also subdue the itching.

℞. Argenti nitratis, gr. xv;
Spirit. ætheris nitrosi, f℥j.—M.

Eczema of the Genitals.—Eczema of the penis is not very common. It usually assumes the erythematous form, which may attack one or another part of the organ, and especially the portion lying against the scrotum; occasionally, however, the whole penis is involved in the inflammation and becomes enormously increased in length and thickness. Moist eczema of the scrotum is very frequent; there is much swelling, and a very offensive gummy secretion is constantly being poured out. Chronic erythematous and squamous eczema is often to be seen in these parts, and is exceedingly rebellious to treatment. In such cases the skin is profoundly infiltrated and the natural furrows are exaggerated.

Vesicular eczema, soon becoming an eczema rubrum, which is attended by much swelling, is prone to attack the labia majora in women. However, all grades of the disease may occur on the female genitalia, and the eruption may extend into the vagina. In all obstinate eczemas of these parts it is well to examine the urine for sugar, and to seek for a possible causation in the presence of pediculi, and also to ascertain if a leucorrhœa has any influence in maintaining the disease. In acute eczema of the penis and scrotum soothing measures are demanded, such as the calamine-and-zinc lotion and the oxide-of-zinc emulsion with almond oil. Eczema of the prepuce is best treated with Lassar's paste. Subacute eczema of the scrotum and labia does well under the tar-and-zinc salve, and if the itching is very severe Bulkley's method with hot water is valuable.

Diachylon ointment or diachylon-lanolin mull is sometimes better borne than even the mildest preparations of tar. These various dressings should be kept in position by a suspensory—preferably Unna's—in men, and by a T-bandage in women. In the infiltrated, chronic type of the disease Veiel recommends an ointment of tar and diachylon (1 : 20, which may be gradually increased to 1 : 2). In women, the nitrate-of-silver solution (16 grains to the ounce) is often of benefit.

Another valuable method is to rub the scrotum with a solution of salicylic acid in alcohol (1 drachm to 4 ounces), and then to apply, spread on muslin, a salve of boric acid or the ordinary diachylon ointment.

Eczema of the Hands and Feet.—Eczema of the hands and feet is frequent. One hand or foot may be affected, or the hands and

the feet alone, or both the hands and feet at the same time. The hands are oftener attacked than the feet. Any form of the disease may appear here, from the acute vesicular to the chronic infiltrated eczema. Occurring on the palms and soles as eczema rimosum, the disorder occasions much distress.

In acute vesicular eczema of the hands the calamine-and-zinc lotion, applied on soft rags, gives uniform satisfaction. After the subsidence of the acute symptoms the rough and scaly epidermis may be rendered smooth and pliant by inunctions of lanolin and olive oil.

Eczema of the backs of the hands and feet should be treated according to the necessities of the case by tar-and-zinc salve, by white precipitate ointment (30 grains to the ounce), or in eczema rubrum by soaping and diachylon ointment. Unna's diachylon-salve mull, and in more chronic cases the diachylon-plaster mull, are elegant and convenient dressings, for the fingers especially. Where there is much thickening the compound salicylated soap plaster is effectual. In the infiltrated eczema of the palms and soles it is necessary to get rid of the thickened epidermis. Salicylic acid answers admirably for this purpose. Unna's salicylic-acid plaster mull is a very elegant and efficient application, although in its absence the acid may be ordered in traumaticin or collodion in the strength of $\frac{1}{2}$ to 1 drachm to the ounce. An equal quantity of chrysarobin may be added to the salicylic acid. The salicylated soap plaster, containing 10 to 15 per cent. of the acid, may also be prescribed with good effect. After the thickened epidermis has been removed a tar ointment (oil of birch 1 drachm, ointment of rose-water 1 ounce) should be rubbed into the patches twice a day.

Eczema of the feet in its manifold expressions should be treated upon the same general principles. When the disease occurs between the toes, powders (such as thymol 1 grain, pulverized oleate of zinc 1 ounce), or pastes, especially in the form of Lassar's or Ihle's, do better than ointments. In obstinate cases painting occasionally with solution of nitrate of silver (16 grains to the ounce) is beneficial. In all forms of eczema of the hands and feet freedom of the parts from irritating influences of every sort is of essential importance.

Eczema of the Nails.—The nails are sometimes attacked by eczema, but although the disease may affect one or more of them without being present elsewhere, the hands are, as a rule, similarly involved in the disorder. In some cases the skin around the sides and base of the nail is thickened, red, and very itchy, or the nail itself may be affected, becoming rough, lustreless, marked with lines and furrows, and exceedingly brittle.

Arsenic, given internally in moderate doses and over long periods, is of undoubted value in chronic nutritive disorders of the nails. Small doses of sulphur and cream of tartar (5 grains of the first and 1

grain of the latter) are recommended by Garrod. Locally, Shoemaker recommends an ointment of tin oleate. For the condition called by H. Hebra hyperkeratosis subungualis, salicylic acid made into a paste with vaseline and kept in position by a diachylon-plaster mull is of benefit.

Eczema of the Legs.—Eczema of the lower limbs is tolerably frequent in the elderly and among those who are compelled to stand much, but it is rare among children. While all types of the disorder occur in this situation, the form known as eczema rubrum is the most usual. Varicose veins and ulcers are frequent complications of the latter condition, and the dilated and tortuous vessels may be regarded as the exciting cause of the eczema.

The treatment of the ordinary forms of eczema is the same on the legs as on other portions of the body, but the management of eczema rubrum and the varicose state requires more detailed consideration.

Hebra's method with green soap and diachylon ointment undoubtedly gives the best results in eczema rubrum of the legs. The following directions should be closely followed: In the first place, before beginning the soaping, the lead salve should be evenly spread on strips of muslin and put aside in a convenient place; the next step is to dip a piece of flannel into lukewarm water, and, having wrung it nearly dry, smear on it a piece of the green soap of the size of a hickory-nut. The soap should now be firmly rubbed into the affected parts for a few minutes, and when this has been accomplished the flannel should be dipped into the water again, and while still wet briskly rubbed over the surface once more. As soon as this process has been concluded the lather should be washed off, the skin gently dried, the prepared muslin evenly and neatly applied, and the dressing kept in place by a roller bandage. According to circumstances the soap frictions may last from five to twenty minutes and be repeated once or twice a day. After the first rubbings the skin will look very angry, but presently the itching diminishes, the infiltration disappears, and the surface gradually assumes its normal appearance. In other cases, especially when the exudation and crusting are moderate, glycerin jelly is a good application. The formula given on a preceding page may be employed, or the preparation suggested by Morrow, which is made after the following manner: Add 250 parts of glycerin to 1000 of gelatin and 2000 of water, and with this combine 10 per cent. zinc oxide and 1 per cent. carbolic acid. Duhring and Van Harlingen speak well of Squire's glycerole of subacetate of lead, of the strength of 15 to 30 grains of subacetate of lead to the ounce of glycerin. Strips of linen soaked in this preparation, after being applied to the limbs, are covered with wax paper, and over this a bandage. The dressing should be freshly put on once or twice daily.

Pick's linimentum exsiccans may conveniently take the place of the glycerin jelly first mentioned:

| | |
|---|---|
| ℞. Tragacanth., | gr. lxxv; |
| Glycerini, | ♏xxx; |
| Aquæ, | f℥iij. |
| M. et adde, | |
| Acidi carbolici, | ♏xv; |
| Zinci oxidi, | ℥iiss. |

Martin's rubber bandage is particularly valuable when there are varicose vessels and eczematous ulcers, but it is a great mistake to apply it directly to the skin. On the contrary, the leg should be first powdered with oxide of zinc, lycopodium, or starch, a large stocking be drawn on, and the rubber bandage applied over all. The bandage should be put on before getting out of bed in the morning, and removed only upon assuming the horizontal posture at night. The ulcer itself should be powdered with iodoform or iodol, and the inflamed margin covered with diachylon ointment, Lassar's paste, or glycerin jelly. So soon as the ulcer has reached the level of the surrounding skin, the iodoform must be discontinued and the ulcer covered with a simple salve. As a prophylactic measure the elastic bandage must be constantly worn, even after a cure has been effected.

Universal Eczema.—Eczema is but rarely absolutely general, although occasionally the whole integument, from crown to sole, may be involved. The erythematous form of the disease is most apt to become general, or else different parts of the body may show different types. An almost universal papular eczema is not uncommon among elderly people.

When extensive areas of skin are involved, it is well to put the patient to bed, especially if aged. In the local treatment powders and lotions serve best, more particularly in erythematous and papular forms; but when the lesions are moist, linimentum calcis with creasote, or Crocker's calamine-and-zinc liniment, is preferable.

## Prurigo.

This is a chronic inflammatory disease which develops first in childhood, and is characterized by an eruption of pale, discrete papules. Itching is a marked feature. The disease first manifests itself in infancy in the form of urticarial wheals, followed later by papules. These are of the size of hempseed, at first of the color of the skin, and more easily felt than seen; but after a time they become darker and covered by blood- or serum-crusts, due to scratching. The extensor surfaces of the limbs are the favorite sites of the eruption. The secondary

changes, infiltration, pigmentation, desquamation, will depend on the degree of pruritus. Some have doubted the propriety of classifying prurigo as a distinct disease, regarding the group of symptoms as secondary to various causes acting on a susceptible skin. However this may be, the disease, once established, is sufficiently characteristic to warrant us in assigning it a place by itself.

Internal treatment consists in the use of good food and careful regulation of the hygienic surroundings. Tonics and supporting remedies are indicated. To allay the itching various remedies have been administered. The most efficacious are bromide of potassium, tincture of cannabis indica, and the hypodermic use of pilocarpine. A variety of local measures have been advised, as hot or cold baths, mercurial, alkaline, and tar baths, etc. Sometimes in severe cases good results are obtained by first rubbing the parts with green soap, following this with a bath, and then applying an ointment of tar or sulphur. In fully-established cases in the adult a cure is not to be expected, but much may be done by treatment to relieve the suffering of the patient.

## Acne.

Acne is an inflammatory disease of the sebaceous glands, occurring mostly about the face, chest, and back, and, according to the intensity of the process, made up of papular, pustular, or tubercular lesions. Next to eczema, it is one of the most common affections of the skin. It is most frequently encountered from the age of puberty up to the age of twenty-four or thereabouts. Whatever the cause or causes of acne may be—and here there is considerable divergence of opinion—it is a noteworthy clinical fact that the disorder generally first develops at the period of adolescence, and that we find menstrual and gastro-intestinal derangements in close connection with it.

Hygienic and dietetic measures are urgently demanded in most cases. Under the first head are to be recommended tepid or cold sponge-baths, followed by brisk friction of the skin, which should be taken every morning, and also one or more Turkish baths a week. Patients should be encouraged to take regular exercise, preferably in the form of a walk of half an hour's duration, morning and evening, although in weakly persons this should be approached gradually, as undue fatigue is always objectionable. Well-ventilated apartments and early hours should be insisted upon. As many acne patients suffer from dyspepsia and constipation, it is better to overcome these states by judicious feeding and regular habits than by drugs, which only palliate and do not cure. Stimulating foods and drinks, such as soups, spices, gravies, pickles, cheese, wine, beer, spirits, tea, and coffee, should be prohibited. Oatmeal, hot and fresh bread, and cakes, pastry, and fried foods generally are particularly harmful. Sweets and all kinds of nuts are to

be avoided. Patients should be encouraged to drink milk where it agrees, and to eat broiled beef-steak, mutton-chop, roast beef, the white meat of fowls, well-cooked and digestible vegetables, especially those that do not contain too much saccharine or starchy matters, and to indulge in most fruits except bananas. If constipation is a prominent feature, order a large cup of hot water to be slowly sipped half an hour before breakfast and on retiring at night. Only enough water should be drunk at meals to secure mastication of the food, and on no account should a meal be prefaced with a gobletful of iced water. It is well to drink copiously of water between meals, and especially should a glassful be taken about two hours after a repast. An action of the bowels should be solicited at the same hour every day, and patients should be warned not to read while at stool. Gentle kneading of the bowel in the direction of the colon at this time is also to be advised.

It is needless to say that as regards internal treatment with drugs we have no specifics. The so-called blood-purifiers, such as sarsaparilla and iodide of potassium, are useless, and the latter is positively injurious.

The treatment must necessarily be symptomatic. It should be our care to seek out all complications and remove them if possible. Dyspepsia and constipation are to be treated on general principles if anything is required in addition to the dietetic and hygienic measures outlined above. Sometimes in plethoric subjects, when there are costiveness, coated tongue, and much local hyperæmia, the mistura ferri acida serves a good purpose:

℞. Magnesiæ sulphatis, ℥j;
Ferri sulphatis, gr. iv;
Sodii chloridi, ℥ss;
Acidi sulphurici diluti, f℥ij;
Infus. gentianæ, q. s. ad f℥iv.—M.

Sig. A table-spoonful in a goblet of water half an hour before breakfast.

Another method of overcoming constipation is by the administration of a tea-spoonful of common salt in a large glassful of water half an hour before breakfast. In obstinate cases, especially to begin with, a nightly pill of aloin, strychnine, and belladonna may be ordered. When the bowels are unusually sluggish the pills of iron and aloes (aqueous extract of aloes 1 grain, and sulphate of iron 2 grains) recommended by Spender will be found valuable. One such pill should be taken three times a day at first, but afterward the dose should be rapidly diminished until one every few nights will be found sufficient.

Cascara sagrada in suitable doses is very valuable. It is usually

given in the form of a fluid extract, 10 or more drops in water before meals, but Blanc[1] prefers it in pill:

℞. Ext. cascaræ sagradæ, ʒss;
Ext. hyoscyami, gr. iv.—M.
Ft. pil. No. xx.
Sig. One pill morning and evening.

Anæmic patients, especially young girls, are best treated with some preparation of iron. Blaud's pills, particularly when combined with nux vomica, may be highly recommended. The following combination is also efficacious and tolerably pleasant:

℞. Tinct. ferri chloridi,
Acidi phosphorici diluti, āā. ℥j;
Spirit. limonis, fʒss;
Glycerini, f℥ij.—M.
Sig. A tea-spoonful in water one hour after each meal.

In weakly subjects, with a tendency to cold hands and feet and markedly greasy skins, malt extracts and cod-liver oil may be prescribed with confidence after attending to the state of the digestive functions.

An emulsion made in the following way is very eligible:

℞. Olei morrhuæ, ℥iv;
Pancreatini saccharati, ʒj;
Pulv. acaciæ, q. s.;
Glyceriti hypophosphitis,
Syr. calcii lactophosphatis,
Aquæ, āā. f℥iv;
Olei gaultheriæ, gtt. xxx.—M.
Sig. A table-spoonful three times a day, after meals.

In acne of an irritable type, when there is considerable hyperæmia of the skin, Taylor gives alkalies for periods of two or three months:

℞. Potassii acetatis, ℥j;
Sodii et potass. tart., ℥ij;
Syr. zingiberis, f℥ij;
Aquæ, q. s. ad f℥viij.—M.
Sig. A table-spoonful in a wine-glassful of water after meals.

Bulkley speaks highly of the use of the following mixture in acne indurata:

[1] *Journ. Am. Med. Ass'n*, Oct. 25, 1890.

℞. Potassii acetatis, ℥ss–j ;
Tinct. nucis vomicæ, f℥ij ;
Extracti rumicis fld., f℥iv.—M.
Sig. A tea-spoonful in water half an hour before eating.

When constipation coexists, Bulkley recommends the addition of 20 to 30 drops of the fluid extract of cascara sagrada to each tea-spoonful of the foregoing mixture, and from 10 to 20 drops of the tincture of cypripedium in the case of menstrual disturbances.

Bichloride of mercury in small doses ($\frac{1}{32}$ grain), with tincture of bark or the protoiodide of mercury ($\frac{1}{60}$ to $\frac{1}{40}$ grain) in tablet triturates, sometimes is useful in chronic cases.

The routine administration of arsenic is generally barren of much benefit. In acute cases it does harm, but in the anæmic, who may need a tonic, there is no objection to its exhibition :

℞. Liq. potassii arsenitis, f℥j–ij ;
Vini ferri, f℥iv.—M.
Sig. A tea-spoonful in a wine-glass of water directly after meals.

Piffard speaks well of the bromide of arsenic in some forms of the disease, and McLaughlin[1] has found the sulphide of arsenic to act very satisfactorily.

The sulphide of calcium in small doses, from $\frac{1}{40}$ to $\frac{1}{10}$ grain in tablet triturates or gelatin-coated pills, undoubtedly limits the suppurative process, but it does not exert a permanently curative effect. Fluid extract of ergot in ½-drachm doses, three times a day, as recommended by Denslow, is occasionally useful. Ichthyol internally seems to possess little curative effect.

It has been claimed that in the acne of young men due to sexual causes great relief has been procured from the passage of cold sounds into the urethra ; also that hot vaginal douches have been equally successful with young women. Winfield[2] has recently reasserted the great benefit of this method (Sherwell's) in selected cases.

The local treatment of acne is of prime importance, and to gain a successful issue in any case requires the utmost care on the part of the physician and implicit obedience by the patient. The topical applications may be either soothing or stimulating in character.

G. H. Fox has called attention to the fact that in some cases of acne the sebaceous element is predominant, while in other cases the vascular disturbance is the notable feature present. In these latter cases,

[1] *Journ. Am. Med. Ass'n*, Dec., 1889, p. 897.
[2] *Journ. Cutan. and Genito-Urinary Dis.*, March, 1891.

in addition to the general measures already mentioned, the most soothing remedies are demanded, and frequently are all that are required. The following lotions are applicable under these circumstances:

℞. Zinci oxidi, ℥ss;
Pulv. calaminæ præp., ℈iv;
Glycerini, ℥j;
Liq. calcis, f℥vij.—M.
Sig. Shake well before using.

℞. Bismuthi subnitratis, ʒij;
Acid. hydrocyanici diluti, ʒj;
Glycerini, fʒij;
Aquæ rosæ, q. s. ad ℥iv.—M.

Unguentum aquæ rosæ or a bismuth salve may be employed when lotions do not agree. In some slight cases a powder of precipitated sulphur diluted with two or three parts of rice-powder is often of advantage.

In the great majority of instances of this disease active measures are called for from the first. All comedones should be thoroughly but gently expressed with a watch-key or other suitable instrument. Papules and pustules should be stabbed with an acne lancet and allowed to bleed freely, and the hæmorrhage may be encouraged by the application of hot water. It is well to prick even the papules as soon as they appear, since their course is thereby shortened. In extensive eruptions of acne some physicians go over the surface with a dermal curette, tearing off the tops of papules and pustules, thus allowing the easier extrusion of the subaceous plugs. In acne indurata the incisions into the nodules should be made with a free hand. After the employment of any of these harsh mechanical methods the patient should foment the parts for a few minutes with cloths wrung out in hot water, and afterward mop on a soothing lotion. In cases of moderate severity, after expressing sebaceous plugs and incising lesions, I am in the habit of ordering vigorous friction every night with a piece of flannel dipped into a soap-wash composed as follows:

℞. Saponis olivæ præp.,
Alcoholis, āā. f℥j;
Aquæ rosæ, f℥vij.—M.

In the morning a soothing ointment or lotion is to be applied.

In other cases the immediate employment of some preparation of sulphur has a more beneficial effect, as, for example,

℞. Sulphuris præcipitati, ʒj ;
Alcoholis, fʒiv ;
Ætheris, fʒiiiss.—M.
Sig. Shake before using. Apply at night and once or twice during the day.

℞. Sulphuris loti, ʒiij ;
Spirit. camphoræ, fʒiij ;
Sodii boratis, ʒij ;
Glycerini, fʒvj ;
Aquæ, q. s. ad fʒiv.—M.
Sig. Shake well and apply freely.

In the ordinary form of acne, what is known as acne simplex, the writer has secured remarkably good results from the local use of boric acid, as recommended by Dr. S. E. Post :[1]

℞. Acidi boraci, ʒss ;
Alcoholis, fʒviij.—M.
Sig. Shake well and apply several times a day.

Dr. Post suggests that the face should be washed with ammonia at night (5 drops of the water of ammonia to half a bowl of warm water), and that in the morning simple cold water without soap be employed. In cases of a somewhat severer type the well-known "lotio alba" may be mopped on at night and the boric-acid wash applied during the day :

℞. Zinci sulphatis,
Potassii sulphureti, āā. ʒij ;
Glycerini, fʒij ;
Aquæ rosæ, fʒiv.—M.
Sig. Shake. Apply at night.

Blanc adds 2 drachms of oxide of zinc to the above mixture, which in some cases is a decided improvement.

Mercurial lotions are sometimes of advantage :

℞. Hydrargyri chloridi corros., gr. j ;
Tinct. benzoini, fʒij ;
Mist. amygdalæ, fʒvj.—M.
Sig. Apply lukewarm.

One of the most satisfactory methods of treating acne indurata is with the Vleminckx solution :

[1] *N. Y. Med. Journ.*, June 18, 1890.

℞. Calcis, ℥ss;
Sulphuris sublimati, ℥j;
Aquæ, f℥x.—M.
Boil down to six ounces and filter.

In acne of the back this solution may be used diluted one-half with water at first, and then, after tolerance is established, of full strength. We are indebted to C. Heitzman for directions as to its systematic employment in acne of the face. Before the use of the solution is commenced, some time—in severe cases several weeks—should be consumed in getting rid of comedones by inunctions with strong lather of green or castile soap; also during the treatment the emptying of comedones must be kept up and continued from time to time to prevent relapses, and all lesions must be incised. The preparatory treatment having been accomplished, the patient is directed to commence with the solution in the strength of 1 table-spoonful to 5 table-spoonfuls of water; after three or four days he will take 1 to 4½ of water; then 1 to 4, and so on with ½ a table-spoonful less of water every fourth night, until the remedy is used pure. Sometimes the solution cannot be pushed to its full strength, and the result is obtained with dilutions of one, one-half, one-third, or less; or it may be that, instead of increasing the strength every fourth night, we must pause at a given dilution for a week or more, and then proceed gradually. The remedy should be merely mopped on at first; and afterward, if it is tolerated, rubbed in more firmly. If much dermatitis is set up, a little cold cream may be smeared on during the day or the applications may be intermitted for a short time.

Ointments are often prescribed in the treatment of acne, although there is reason to believe that they are much less efficacious than lotions. They should be very thoroughly worked into the skin:

℞. Sulphuris hypochloridi, ʒij;
Potassii carbonatis, gr. x;
Adipis benzoati, ℥j;
Olei amygdalæ amaræ, gtt. ij.—M.
Sig. Rub in a small quantity at night.

℞. Sulphuris præcipitati, ʒj;
Ung. aquæ rosæ, ℥j.—M.
Sig. Apply at night.

Ointments of the various mercurial preparations have been advised for cases needing active stimulation; *e. g.* protoiodide of mercury (5 to 10 grains to the ounce) and white precipitate (20 to 30 grains to the ounce).

Lassar recommends the following paste for all forms of acne:

℞. Naphthol., gr. xxxv;
Sulphuris præcipitati, ʒiij;
Vaselini,
Saponis viridis, *āā.* ʒiss.

This is to be spread upon the skin to the thickness of the back of a knife-blade, and left on for fifteen or twenty minutes, when it will cause a little burning. It is then to be wiped off with a soft cloth and the skin powdered with talc. The skin soon becomes inflamed, then turns brown, and finally peels off. The desquamation can be hastened by the application of 2 per cent of salicylic acid with Lassar's paste.

In severe acne L. Dietzmann advises a similar preparation:

℞. Naphthol., ʒiiss;
Sulphuris præcipitati, ℥iss;
Lanolini,
Saponis viridis, *āā.* ℥ij.—M.
Sig. For local use.

Ichthyol, resorcin, and, lately, thiol, have also been employed with more or less success in acne, but the writer's experience with these drugs has not been especially favorable. Ichthyol may be ordered in ointment or paste, or, according to Unna, in the form of a varnish, as follows:

℞. Ichthyol., 40 parts (by weight);
Starch, 40 parts;
Albumin solution, concentrated, about 1–1½ parts;
Water, to make 100 parts.

The starch must be moistened with the water, the ichthyol then rubbed in, and finally the albumin added.

The individual lesions may be touched as they appear with acid nitrate of mercury (Hutchinson) or with the pure carbolic acid, and afterward covered with a film of collodion (W. G. Smith).

Faradization of the face is often helpful in sluggish cases.

## Acne Rosacea.

Acne rosacea is a chronic hyperæmic or inflammatory affection of the skin, which is usually found upon the face, and more particularly the nose, cheeks, forehead, and chin; also occasionally on the neck. The salient clinical symptoms are at first simple, more or less transient

redness, which later becomes permanent, and the subsequent development of papules, pustules, and varicose vessels; and finally, in some cases, the excessive formation of new tissue. Acne rosacea is nearly always a reflex disorder, and is brought into existence by various affections of the stomach, bowels, and, in women, sexual disturbances. Anæmia, chlorosis, and also excessive heat or cold, are to be regarded as causative factors.

The treatment is both internal and local. A searching investigation as to the cause or causes of the disease should be instituted, and the general treatment directed accordingly. Dietetic and hygienic regulations should be rigorously enforced. (See Acne.) In chronic gastric catarrh lavage of the stomach is invaluable. Ichthyol has been given with asserted advantage.

The character of the local means employed will depend upon the stage of the disease. During the congestive period mildly stimulating lotions of mercury, sulphur, bismuth, or zinc will prove beneficial. In the early erythematous phases of the disease Pringle praises a lotion made of 1 drachm of liquor plumbi subacetatis to the ounce of fresh milk. The following lotion is also useful:

℞. Bismuthi subnitratis, ʒij;
Acidi hydrocyanic. diluti, fʒij;
Misturæ amygdalæ, fʒviij.—M.
Sig. Shake well before using.

The sulphuret-of-potassium lotion (see Acne), mopped on at night, gives excellent results in most cases. Van Harlingen thinks highly of a lotion of sulphur and camphor:

℞. Sulphuris præcipitati, ʒj;
Pulv. camphoræ, gr. v;
Pulv. tragacanthæ, gr. x;
Aquæ rosæ,
Liq. calcis, āā. fʒj.—M.
Sig. Apply once or twice a day.

In cases of the second degree all pustules should be opened, tubercles freely incised, and the invaded region should be fomented with hot water several times a day. The best local application in my experience is the Vleminckx solution, which should be employed in the manner described under the treatment of Acne.

The best method of destroying the varicose vessels is by electrolysis, as first suggested by me several years ago.[1] A fine jeweller's bristle or

[1] *Archives of Dermatology*, Oct., 1879.

dental reamer is attached to the negative pole electrode of a galvanic battery (by means of a suitable holder), and the needle is inserted into the vessel to a sufficient depth; the circuit is then closed by the patient touching the positive sponge electrode with the tips of the fingers: after the electrolytic action has developed, as shown by the vessel becoming a white line, the fingers are removed from the positive sponge electrode and the needle is withdrawn from the tissues.

Sometimes one puncture is sufficient for obliteration, but if the vessel be long several insertions may be made along its course. If the operation is carefully done, no scarring need result. It is true that a collateral circulation is often set up, and the operation must be repeated; but in cases in which the cause of the disease has been removed I have seen permanent results. In the mean time the improvement in the patient's appearance is very noteworthy. The strength of current employed will depend somewhat upon the locality operated upon, the size of the vessels, etc. It is probably best in the various electrolytic operations on the skin to employ a milliampèremeter, but it is not absolutely necessary.

Various other methods of treating rosacea have been recommended. In cases of a marked type many employ some form of multiple puncture or scarification. Vidal speaks highly of what he calls linear quadrilateral scarifications. Shoemaker uses a needle-knife, with which he makes numerous punctures, while at the same time he constantly applies hot or very warm water. Kaposi advises a solution of iodated glycerin (5 parts each of pure iodine and iodide of potassium to 10 of glycerin), which is painted over the affected region eight to twelve times a day for three or four successive days, and immediately covered with gutta-percha paper. Carbolic acid, 1 part in from 2 to 6 parts of alcohol, is said by Duhring to be useful.

In the hypertrophic variety of rosacea, with excessive outgrowth of tissue, ablation by the knife is the only remedy. I have relieved moderate degrees of thickening by electrolysis, plunging the needle quite freely into the tissues in various directions.

The prognosis in cases of mild grade is generally favorable, and even where the disease has existed for a long time, if the cause can be ascertained and removed, gratifying results may be obtained. On the other hand, palliation is frequently all that can be promised.

## Sycosis.

Sycosis, mentagra, folliculitis barbæ, as it is variously called, is an inflammatory disease, generally chronic, which affects the hair-follicles, particularly of the beard, and is characterized by papules, pustules, and tubercles, perforated by hairs, together with infiltration of the skin and crusting. More or less scarring and permanent baldness results in long-

continued cases. Unna not inaptly terms this form of the disease coccogenic sycosis, and there are strong reasons for regarding the process as infective.

In many cases general tonic treatment is urgently demanded, as patients with sycosis are often run down and out of health. Arsenic, mercury, and antimony have been given empirically with asserted advantage. The sulphide of calcium in $\frac{1}{10}$-grain tablet triturates every two hours may be administered in the hope of lessening suppuration, but its efficacy is doubtful. In the acute stage soothing applications are required, such as linimentum calcis, olive or almond oil, lead lotion, and black wash, followed by zinc salve. The hair should be closely trimmed, and crusts removed by oil inunctions or a borated starch poultice. If the patient is first seen when the disorder has become somewhat chronic, shaving and epilation are indispensable. The beard should be shaved at least every other day, and the hairs extracted from all pustules. After this procedure has been gone through, the parts should be fomented with very hot water, and subsequently a soothing salve, such as unguentum vaselini plumbicum, applied spread on strips of muslin.

Robinson praises the following ointment:

℞. Ung. diachyli,
Ung. zinci oxidi, āā. ʒiss;
Ung. hydrarg. ammon., ʒiij;
Bismuthi subnitratis, ʒiss.—M.

In cases of moderate severity Rosenthal's paste is exceedingly valuable:

℞. Acidi tannici, gr. lxxv;
Sulphuris præcipitati, ʒiiss;
Pulv. amyli,
Zinci oxidi, āā. ʒiss;
Vaselini, ℥iss.—M.

As this preparation is very conspicuous when worn during the day, it may be applied at night only, and during the day the following salve should be thoroughly worked in the skin, morning and evening:

℞. Acidi salicylici, ℈j;
Sulphuris præcipitati, ʒiss;
Vaselini, ℥j.—M.

Brooke recommends an ointment of mercury and ichthyol as very efficacious:

℞. Hydrargyri oleatis (2½ per cent.), ℥j ;
Ammon. sulph.-ichthyolici, ♏xx ;
Acidi salicylici, gr. x ;
Olei lavandulæ, gtt. ij.—M.
Sig. Apply on strips of linen.

Lassar states that the following salve is of value in all pustular affections of hairy parts :

℞. Hydrarg. sulphid., gr. xv ;
Sulphuris sublimati, ʒvj ;
Adipis, ℥iiss ;
Olei bergamottæ, q. s.—M.

If the infiltration is very great, it will be necessary to reduce it with green-soap frictions, followed by diachylon ointment, as in eczema. Very frequently sycosis of the upper lip is kept up by nasal catarrh, and consequently the discharge should be treated at the same time. After recovery the shaving should be continued for a long time, and if the skin remain dry, red, and scaly, inunctions of cold cream and lanolin may be made at night.

## Impetigo.

Duhring defines impetigo as an acute inflammatory disease characterized by one or more pea- or finger-nail-sized, discrete, rounded, and elevated firm pustules, unattended, as a rule, by itching. Both T. C. Fox and Crocker, among recent English observers, deny to this affection a distinct position. Subjective symptoms are, as a rule, absent in impetigo. The lesions of the skin consist of one or more pustules, varying in size from one-eighth to one-half inch in diameter, rounded, with thick walls and surrounded by an areola. They appear suddenly and come out one after another during the first week of the attack. The pustules, having attained their full size, run on unchanged for a day or two, and then undergo absorption or crusting. The amount of crusting varies, at times being entirely absent. After the crust is shed, a reddish surface is exposed, but there is no scar or pigmentation. Children are most prone to this disease. It seems very probable that impetigo is due to inoculation with pus-cocci, and is only contagious in the same sense as this term might be applied to furunculosis. According to Duhring, the disease is self-limited, and, beyond opening the pustules as they appear and the use of some mildly-stimulating ointment, no active treatment is required. But in my practice certain sparse pustular eruptions that I have seen have not done so well under the expectant plan of treatment. In some cases

careful attention to diet and the use of tonics seem to be needed. In addition to this, the local use of some parasiticide is to be recommended, such as the following:

℞. Iodoformi, gr. xv;
Vaselini, ℥j.—M.

### Impetigo Contagiosa.

This is an acute, inflammatory, contagious disease, characterized by the appearance of vesico-pustules or blebs which dry into flat, straw-colored, granular-looking crusts. Children are most frequently attacked, though the disease occurs in young adults. The lesions begin as minute, discrete, acuminate vesicles, which enlarge to the size of a split pea, or even to the size of a silver quarter-dollar. The contents, at first serous, soon become sero-purulent. In a few days the lesions dry up into thin, granular-looking, straw-colored crusts, which, from having no inflammatory areola, appear to be stuck on the skin. The disease is most prone to attack the face and hands. It usually runs its course in two or three weeks, though by auto-inoculation it may be prolonged. Impetigo contagiosa is, as its name implies, contagious, and depends on the presence of a micro-organism. A number of observers have reported the finding of fungi in the crusts, but these observations have not been uniform.

The treatment is as simple as it is effectual. It consists in the application of the following ointment:

℞. Hydrarg. ammoniati, gr. x–xv;
Ung. aquæ rosæ, ℥j.—M.
Sig. Apply to eruption after crusts are removed.

### Impetigo Herpetiformis.

This is a very rare disease, only 13 cases having been reported. It would seem to be as fatal as rare, 12 of the cases resulting in death. The local manifestation consists of superficial, miliary pustules, which may be discrete, but are usually closely set. They have a tendency to form circular groups. The contents of the pustules, at first opaque, later become greenish-yellow and dry up into dirty-brown crusts. While the central pustules are undergoing this evolution, new pearl-like lesions appear around the border of the patch, and by coalescence large areas become involved. If the crusts be removed, the skin is seen to be red and covered with a new epidermis as moist as in eczema, with a smooth infiltrated surface or presenting papillary elevations. After three or four months the disease affects almost the whole surface, exhibiting swollen, crusted, and excoriated patches here and there, still surrounded

by pustules. The eruption usually develops first on the inner side of the thighs and about the groins, navel, breasts, and axillæ. It has been thought to be connected with the pregnant state, as 11 of the 13 cases occurred in pregnant women, but delivery was without effect on the course of the disease.

Treatment has so far proved of little or no avail.

## Ecthyma.

The eruption in this disorder consists of large, flat pustules, which are usually flaccid and of a yellowish or yellowish-red color. They vary in size from a ten-cent piece to a silver quarter-dollar, and are surrounded by a distinct inflammatory areola. The lesions soon dry up, and on removing the brownish crusts we find a slightly excoriated surface, oozing a yellowish secretion slightly tinged with blood. The legs and thighs where the hairs are thick are the favorite sites for the eruption. The pustules are prone to occur in crops, and may thus prolong the attack for an indefinite period. It is doubtful if ecthyma is a disease *sui generis*. Depraved conditions of health and unhygienic surroundings predispose to the affection. Like furunculosis, it is probably the result of inoculation with micro-organisms, and prone to occur after local irritations of all sorts. In patients who are suffering from debility or any disorder of the general health, tonics are indicated, and the physician should direct his remedies toward any organ found at fault. The diet should be regulated, cleanliness insisted upon, a sharp lookout kept up for pediculi, and the hygienic surroundings made as good as possible. Locally, I have found the following ointment give speedy relief:

℞. Hydrarg. ammoniati, gr. xv;
Ung. aquæ rosæ,
Ung. zinci oxidi, *āā.* ʒss.—M.

Or,

℞. Iodoformi, ʒj;
Vaselini, ʒj.—M.

The last prescription is particularly indicated when the eruption is sluggish.

## Pemphigus.

Pemphigus is an acute or chronic inflammatory disease of the skin, characterized by the formation of variously-sized bullæ that appear in successive crops. Acute pemphigus is much more frequent in children, or rather infants, than in adults, and is undoubtedly contagious. The cases may or may not be febrile, and the disease varies much in its intensity.

The chronic form of the disease is usually encountered among grown persons. The lesions consist of hemispherical or oval blebs, which first make their appearance as transparent vesicles, and increase to the size of a walnut or orange, or several may coalesce to form a large irregular bulla. Each bleb runs its course in from two to eight days, rarely rupturing spontaneously; but the contents become absorbed, leaving a crust or scab formed by the blister-roof. In benign pemphigus the eruption may continue for several months, being kept up by successive attacks, or relapses may occur at longer intervals. In the malignant form the disease may run a rapid course, and end fatally in a few weeks. The subjective sensations consist mostly of burning and a feeling of tension, but where extensive surfaces are affected the suffering is very severe.

A rare type of pemphigus is known as P. foliaceus. In these cases the blebs are flaccid, and soon rupture. The disease spreads slowly but surely, and the whole body eventually becomes involved. As in P. vulgaris, the mucous membranes also may be affected.

In acute pemphigus rest in bed, nourishing food, quinine for the fever, and appropriate tonics are demanded, according to the necessities of the case. In chronic pemphigus it is of vital importance to keep up the strength and to secure sleep. Arsenic is regarded by many as a specific. It is preferably given in solution largely diluted, and the doses must be full and frequently repeated. Bulkley says it is especially serviceable in children. It is a remedy of signal value, but, unfortunately, by no means a specific. The deodorized tincture of opium is also very efficient, either alone or combined with arsenic. The blebs may be punctured to relieve the local tension, but the pricks should be made at the bases of the lesions, so that their roofs may remain intact, in this way serving as a protective covering to the raw surfaces beneath. Simple powder of zinc or lycopodium may be dusted on in mild cases, and the parts protected with a layer of cotton wool. When extensive surfaces are involved Carron oil, to which a few drops of creasote should be added, gives the greatest comfort. In very severe cases the continuous warm bath of Hebra is the only means that will afford relief from the unbearable suffering. The lesions in the mouth should receive appropriate treatment with gargles of boric acid, chlorinated soda, or similar remedies.

# HYPERTROPHIES AND ATROPHIES OF THE SKIN.

By JAMES NEVINS HYDE, M. D.

In the following pages, devoted to a consideration of the therapeutic management of the hypertrophies and atrophies of the skin, the several disorders of each pathological class are named in accordance with the nomenclature, and arranged in the order of classification, of the diseases of the skin adopted by the American Dermatological Association.

## HYPERTROPHIES.

### Of Pigment.

**Lentigo.**—Lentigines, ephelides, or freckles are circumscribed and usually multiple pigmented macules or spots, superficially seated in the epidermis, exhibited in all regions, but chiefly upon the face, the dorsal surfaces of the hands, and the external genitalia, varying in color from a light yellow or fawn to a deep chocolate tint, occurring under the influence of solar light and heat, and either persistent or transitory according to the conditions of the subject of the disfigurement.

Blemishes of this sort are commonly regarded as symptoms of a disease of the skin, but in many cases they are undoubtedly physiological peculiarities of the individual, more particularly of those having a tendency to pigment defect or exaggeration (for example, the red-haired, the mulatto, the albino, etc.) when exposed to light, heat, and moisture in warm atmospheres. Freckles are rarely seen before the sixth year of life, and may completely disappear with advancing age or be wholly or partly removed in the colder weather of winter, only to recur with the warmer season of spring or summer. They are due to circumscribed deposits of pigment in the rete in excess of that found in the surrounding skin. All treatment is hence directed to the removal of this deposit, but none has yet been devised that can correct the special tendency to the deposition of this pigment noticeable in many persons applying for relief. Thus the method which succeeds in securing the desired end most speedily and brilliantly is that which is often followed by the most disastrous results to the comeliness of the integument.

If any vesicating agent be effectively applied to the freckled surface, the more external portions of the rete are as a consequence removed, and with them the most conspicuous of the pigment-spots. A new and fairer stratum corneum soon replaces that which has been lost, but with greater or less rapidity this is followed by a discoloration of still deeper tinge than that which preceded. Devices of this sort are therefore most often employed by charlatans for mercenary purposes. The cautious practitioner should bear in mind that every application to a skin pigmented in excess, sufficient to induce a well-marked hyperæmia of the vascular parts, is apt to be followed by aggravation of these special symptoms. No internal treatment is available in these cases; in a few (*e. g.* atrophic conditions recognized in senility, cachexia, xeroderma, etc.) the color peculiarities may be symptomatic of or incidental to general states requiring appropriate therapy. Prophylaxis by protection of the skin with dusting-powders, such as talc, rice-flour, starch, zinc oxide, and lycopodium, and avoidance of exposure to light, heat, fog, smoke, and rays reflected from the surface of water, are not to be forgotten. The local treatment is that of the disease next considered.

**Chloasma.**—Chloasma, melanoderma, and "liver-spots" are terms applied to diffuse and circumscribed, well or ill defined, irregularly shaped and sized colorations, or dyschromiæ of the skin, in shades of yellow, brown, and black, exhibited in all parts of the skin, but chiefly over the face, and either idiopathic or symptomatic in character.

Idiopathic colorations of this type are illustrated by the changes in the appearance of the skin produced by applications of sinapisms or embrocations and similar agencies, after traumatism or prolonged pressure, and after the attacks of bugs, lice, fleas, and other parasites; while the symptomatic dyschromiæ are the common sequelæ of syphilodermata, lepra, lichen planus, uterine disease, tuberculosis (more particularly that of the abdominal viscera), carcinoma, sarcoma, and other maladies. Treatment directed exclusively to the removal of such pre-existing or coincident disease may be wholly ineffective in removing the induced chloasma, the removal of which, when at all possible, usually requires special therapeutic measures.

The bichloride of mercury stands at the head of the list of remedial agents useful in blemishes due to pigment-changes in the skin, and is the effective agent in most of the proprietary articles sold in the shops for such use. It may be applied in either ointment or lotion, preferably the latter, and in the strength of from $\frac{1}{4}$ grain to 6 grains to the ounce of vehicle, which may be cologne-water, emulsion of almonds, decoction of elm-bark, Irish moss, or linseed; or, what has lately become popular, the *lac virginis*, a drachm or two of the tincture of benzoin or of tolu, with half as much glycerin, in from 4 to 6 ounces of rose-

water. The susceptibility of different skins to the action of corrosive sublimate differs greatly, the larger number resenting a strength greater than 2 grains to the ounce; 5 or 6 grains of the same to the ounce of lotion, if kept in continuous contact with the surface, will usually vesicate. Other formulæ recommended are as follows: Sulphate of zinc and acetate of lead, ½ drachm of each to 4 ounces of rose-water; dilute acetic acid 4 drachms and borax 1 drachm to the ounce of lotion (the mercuric chloride may be added to either of the two last-named solutions in proper strength); citric acid, 1 drachm to the ounce; pastes in varying proportions of acetic acid, sulphur, and kaolin; pure carbolic acid; iodine in tincture; ointment of nitrate of mercury, reduced in strength from one to three times with cold-cream salve; the peroxide of hydrogen; a 15 per cent. solution of chrysarobin in traumaticin; and vesicants applied without the production of exaggerated effects. Wertheim's formula is—

℞. Hydrarg. ammon. chlorid.,
Bismuth., *āā.* ʒij;
Ungt. glycerin., ʒj.—M.
Sig. For external use.

For the discolorations most frequent on the surface of the chest, but also seen elsewhere, produced by the ingestion of arsenic, the best course is the discontinuance of the use of the drug, after which disappearance of the blemishes commonly slowly proceeds. For the more persistent stains following the ingestion of the nitrate of silver (argyria) no remedies have as yet proved effective. The same may be said of the marks produced by the artificial introduction of pigments into the skin (tattooing). When the disfigurement is of sufficiently small size the remedy is excision, followed by skin-grafting by the Thiersch method. When grains of gunpowder have been deposited in the skin by explosion, the use of a vesicant will occasionally expose minute collections of grains of the powder, which may be removed by the delicate scoop used for cataract operations. In the absence of such visible heaps of foreign material, treatment is usually ineffective.

## Hypertrophy of Epidermal and Papillary Layers.

**Keratosis.**—(*a*) *Keratosis Pilaris.*—The lesions of this disorder, termed also lichen pilaris and pityriasis pilaris, are indolent and non-inflammatory, pinhead and somewhat larger, conical, whitish papules, or light-reddish papules with a whitish, grayish, or dirt-colored apex, constituted of masses of horny cells accumulated within or about the hair-follicles, situated chiefly upon the extensor surfaces of the limbs and most conspicuously over the outer faces of the arms and thighs.

They are commonly discrete and seated upon a sound integument, but occasionally occur in the subjects of ichthyosis, xerosis, and cachexia. Indeed, the characteristic "nutmeg-grater"-like condition of the skin produced by these numerous firm papules, each pierced by a broken hair or by a black point representing the top of a hair-stump, or having a minute pilary filament coiled within its mass, is most often encountered in persons of superabundant vigor, men of brawn and women of weight, rather than in the states of health representing the reverse conditions. Though certainly resulting in some cases from neglect of the bath, the disorder may often be studied in its typical evolution in persons of splendid physique and excellent health, who have bathed effectively and frequently, constituting then a quasi-physiological state. There are no subjective sensations produced by these lesions. They frequently furnish the physical basis for the fears of the victim of syphilophobia, and the misconceptions of the patient who supposes them to be evidences of a "disease of the blood."

The accepted treatment is by bathing with warm water, aided by the use of the soda or potash soaps, followed, after drying the skin, by inunction with a fatty unguent, such as lanoline, lard, vaseline, olive oil, the oil of sweet almond, and similar substances. Salicylic acid may be added to the emollient used, in the strength of from $\frac{1}{2}$ scruple to 1 scruple to the ounce of salve-basis. The author has lately employed with excellent results in similar cases a somewhat different plan of treatment. The skin is sponged daily from a bowl with a solution of common salt in water, one quarter of a pound to the gallon, as cool as is well tolerated by the patient, followed by brisk friction with coarse or Turkish towels. The Turkish bath may be employed for the same purpose when not otherwise contraindicated.

(*b*) *Keratosis Senilis.*—In old age the skin not only may atrophy and induce characteristic changes, but there may be also cornification, general or partial, circumscribed or diffuse, more often limited to certain definite regions of the integument, such as the face and the dorsal surfaces of the hands and feet. In these localities one may note in certain individuals of advanced age light or dark yellowish, brownish, or even blackish points, spots, patches, or plates, either dry, scaling, and horny, or scaling and greasy. These flattish lesions, of definite or doubtful contour, at times develop into papules or warty elevations scarcely a millimetre in height, with a verrucous summit. In other cases the thickened and slightly altered epidermis suggests merely a diffuse brownish staining of the skin, where the thickening can scarcely be appreciated. Many of these lesions are the first stages of an epitheliomatous change in the skin; and it is often difficult, without the aid of the microscope, to determine whether the keratosic or the epitheliomatous process is the more active and important. Many, too,

being benign or inactive under hygienic management, are teased into the activity of a malignant neoplasm by injudicious attempts to remove the offending blemishes by the aid of caustic.

The treatment of these lesions is by the use of hot water or steam and hard or soft soaps, followed by salves and pomades containing a simple unguent, to which salicylic acid has been added in the strength of from 10 grains to ½ drachm to the ounce of salve-basis. In the strength of a drachm or more, such unguents, when kept for a time in contact with an offending lesion, leave it, after removal, in a softened and semi-macerated state, when it is readily scraped off the surface of the skin. The same result is well accomplished by pumice (either stone or powder), which removes, as a rule, the discolored surface of such lesions, for relief of which the patient is commonly most anxious. One should never forget, in treating all such conditions in the aged, that the action of caustics and articles having an excessive detersive or stimulating effect has been followed by the development of epithelioma. Even prolonged or continuous action, in such conditions, of an otherwise well-chosen topical agent is to be deprecated.

**Papilloma.**—This term has been employed by writers on dermatology with some looseness to designate a number of excrescences of doubtful nature, even including verrucous, carcinomatous, and sarcomatous growths. Hardaway, Beigel, and others have, however, described under this title excrescences well projected from the skin surface, exhibiting hypertrophied papillæ, resembling in their cauliflower appearance the venereal wart, tending to bleed, to become crusted, and to exhale an offensive odor. The most significant lesions of this kind are unquestionably, as pointed out by Crocker, due to ingestion of the iodine and bromine compounds. The author has exhibited the portrait in oil of a young girl whose case was supposed to be one of lepra, where the lesions were of this papillomatous type and due to the causes named.

The treatment, in the artificial cases, is by withdrawal of the offending medicament, when the growths rapidly shrivel. Others may be scraped with the dermal curette and the bases treated with the bichloride of mercury and benzoin lotion, 1 part of the former to 1000 of the tincture of benzoin.

**Molluscum Epitheliale.**—*Synonyms: Contagious molluscum, molluscum sebaceum; acne varioliforme* Fr.; *molluscum verrucosum.*

Epithelial mollusca are pinhead- to bean- and marble-sized, sessile or pedunculated, yellowish-white, pearly-white, or pinkish, bodies or small tumors, globoid, roundish, or acuminate, imbedded within or projecting from the skin, having usually a dark-colored point at the apex or upon one side of the lesion, from which on pressure can usually be expressed a milky, curd-like, or inspissated cheesy mass. At times

a horn-like mass projects from the central or one-sided punctum. The lesions may be single or multiple, though they rarely occur in great number. They are found most often in children or in patients in early life, and exist upon the face, neck, and genital region, more rarely over the breasts of women, the scalp, and the buttocks. Compound, small, and gigantic tumors as large as a cocoanut are also reported, the last-named being probably of the nature of sebaceous cysts. The question of contagiousness is still *sub judice*, with the authorities divided. Occasionally an infant's cheek and the breast of the mother, with which it lies in contact when being suckled, will simultaneously display similar lesions. Darier and others have lately claimed that the disease is allied to Paget's disease of the nipple and certain lesions of the scrotum, by reason of the invasion of the tissue producing mollusca by psorosperms, the exact facts in this connection being as yet undetermined in consequence of the resemblance to be recognized between these coccidiæ and transformed epithelia.

The simplest method of treating these wart-like bodies is by raclage with the dermal curette, the seat of each being afterward touched with a crayon of silver nitrate. Some authors incise with a bistoury and evacuate the contents of the lesion, leaving the débris to be naturally exfoliated—an issue, let it be remembered, which in the course of time is the inevitable result in all cases. Less preferable is the use of the caustics (acid nitrate of mercury, nitric acid,) and the repeated application of traumaticin or flexile collodion, to each ounce of which has been added from a scruple to a drachm of salicylic acid. Briefly, the treatment of molluscum is that of simple warts, with which it is pathologically allied. Very small and numerous lesions may be made to exfoliate by the vigorous application of green soap and water or the tincture of green soap. White precipitate and sulphur salves, the latter in the strength of 2 drachms, the former in the strength of $\frac{1}{2}$ drachm, to the ounce, are also effective. Less rapid than the curette, but as effective, is electrolysis, the negative pole of the battery being connected with the needle which pierces the lesion and destroys its pedicle.

**Callositas.**—*Synonyms: Tyloma; keratoma; callus; callosity.*

Callosities are congenital or acquired, circumscribed, flattened, or somewhat elevated, horn-like, thickened, and indurated plates of skin, yellowish- or grayish-white in color, of different sizes and shapes, usually unproductive of subjective sensation, and commonly occurring in regions of the body subjected to intermittent pressure, such as the palmar and plantar surfaces. Acquired callosities are well illustrated in the thickenings produced upon the hands of mechanics in the trades, upon the fingers of harpers, over the lips of flute-players, and over the extremities of domesticated and hard-worked animals of several varie-

ties. Rarely they are discovered as congenital peculiarities, and in both congenital and acquired forms may exist as extensive keratoses, involving the entire palm or sole, or both regions symmetrically. Not a few cases are recorded by authors under different titles, such as *tylosis* (vel *ichthyosis*) *palmaris* et *plantaris.* In several of the extreme cases collated in the textbooks such callosities are symptomatic of centric nervous disease—tropho-neuroses, in fact. They are then often accompanied by significant symptoms of disease of the nervous centres, such as profuse hyperidrosis of the hands or of the feet, or of both; erythema in the regions adjacent to the callous patch; hairy growths upon the limbs displaying the lesions; and cardiac or other vascular disturbances.

Treatment is to be pursued only when the callosity is productive of actual harm, since many such indurations are essential to the prosecution of the work of the artisan. When it is desired to remove any calloused patch the parts are first well macerated in hot water, shampooed with green soap, and the corneous material is then cut, scraped, or dug away. The dermal curette is best adapted to some of these cases. When all is removed after repeated soakings, soapings, etc., the surface is well protected with a salicylated salve containing from 1 scruple to 2 drachms of the acid to the ounce of salve-basis. The ointment may be kept for several days in contact with the part, and by the use of such a topical medicament without previous maceration, if the larger quantities suggested be employed, the callosity may be, in the course of a few days, scraped off as a thick whitish and softish layer. The salicylic acid may be also incorporated with traumaticin. Kaposi's remedy for warts, one part of the bichloride of mercury to thirty of collodion, is often effective. The salicylated plasters and mulls may also be employed.

**Clavus.**—*Synonyms: Corn;* Fr., *cor;* Ger., *Huhnerauge.*

Corns are flat, occasionally elevated, and sometimes deeply-seated, horny callosities, circumscribed, occurring for the most part upon the toes, and usually the seat of considerable tenderness, often of pain, due to thickening of the epidermis in consequence of the intermittent pressure of the affected organs with the coverings of the foot. They often possess a conical spur or projecting mass of corneous epidermis, which, being pressed deeply into the sensitive corium beneath, is the source of the pain. The pea- to large-chestnut-sized corns occurring upon the outer faces of the little and of the big toes are commonly dense and horn-like, while those found upon the interdigital faces of the other toes, called soft corns, are more macerated by sweat, subjected to heat, and induced by mediate pressure.

Corns are produced by improperly adjusted coverings of the feet, such as shoes, stockings, socks, slippers, and are best treated by disuse

of the feet. In cases of enforced recumbency of position, as in paralytic, traumatic, febrile, and similar cases of accident or disease, it is common, if convalescence be prolonged, to find that all corns are spontaneously exfoliated. If recumbency be not possible, the foot-covering must be smoothly and neatly adjusted to the foot, a soft, well-fitted stocking and properly fitted shoe being worn. To remove a corn it is first well macerated in hot water and soaped; then picked or pared, care being taken to avoid wounding the soft parts; and, lastly, a perforated felt or amadou plaster is applied over the part, the site of the corn coinciding with the aperture, which latter is at the same time filled with a salve containing a drachm of the tincture of benzoin to the ounce of lard. Or one of the favorite and popular "corn cures" may be used—a drachm or more of salicylic acid to the ounce of collodion, with half an ounce of the extract of cannabis Indica; or a salicylic-acid plaster may be applied; or a small portion of the ointment of the nitrate of mercury spread on a bit of rag and applied over night for two or three applications. To protect the corn without resorting to the "corn plaster" one may use the "emplastrum fuscum"—½ ounce of the red oxide of lead to the ounce of olive oil, with ½ scruple of powdered camphor and 2 drachms of white wax, made *secundum artem;* or the diachylon plaster may be spread upon chamois-skin—the usual method of the chiropodist. Soft corns may be treated with any of the salves named above, or by pencillings of nitrate of silver in crayon, a 4 per cent. solution of caustic potash, glacial acetic acid, tannic acid, oxide of zinc, boric acid in powder, or talc. When inflamed, they should be managed with care, lead lotions, poultices, or hot fomentations being required to relieve the pain, after which one of the applications employed for the hard variety of corn may be tried. Flexible collodion, India rubber, "moleskin," lead-plaster, or resin cerate may be used for the purpose of distributing over the adjacent parts the pressure which gives rise to the corn.

**Cornu Cutaneum.**—*Synonyms: Cutaneous horns; cornu humanum;* (Ger.) *Hauthorn;* (Fr.) *corne de la peau; horny tumor.*

Cutaneous horns are excrescences rising from the surface of the skin, with a deeper portion imbedded within, varying in shape and size; somewhat suggesting the horns of the lower animals; solid, dry, dense, and either smooth or more often corrugated, wrinkled, roughened, laminated, or excavated on the surface; often elongated and conical at the point; occasionally rounded or flattened; and either straight, twisted, or bent at an angle. In color they may be whitish, grayish, yellowish, brownish, or blackish, and are usually thicker at the base than at the extremity. They may be single or multiple, and may involve any region of the body, being, however, most often seen on the scalp and face, and, more rarely, on the genital region or penis. They have been

observed more than one foot in length. Their development is usually slow and unaccompanied by subjective sensation. In the majority of cases the base rests directly upon the skin. In a small percentage of observations an epithelioma has resulted; in a still smaller number they have been found complicating an epithelioma. Pathologically, they are rete over-growths, and hence are treated as warts. They are removed by maceration and scraping or by surgical procedures under an anæsthetic, after which the base is destroyed by caustic potash, a zinc paste, or nitric acid. Recurrence should always be prevented by after use of the caustic selected.

**Verruca.**—Warts are single or multiple, hard or soft, rounded, flattened, or acuminate, circumscribed papillary excrescences, variable in color, and smooth at the summit, or studded with moniliform elevations or by clusters of minute pointed horny filaments.

The single or multiple, pinhead to pea-sized and larger, horny warts, seen often on the hands of young persons of both sexes (v. vulgaris), differ in their lobulations and roughly-capped summit from the flattish warts (v. plana), seen more often in older patients, where the elevation is slight and the surface broad and relatively smooth. The senile forms (v. senilis, keratosis pigmentosa) are usually flattened and markedly pigmented, and found on the faces, trunks, hands, and genital regions of persons usually advanced in years. They are frequently seen in those affected with an epithelioma, and indeed often undergo a metamorphosis into such formations. Verruca digitata is characterized by digitations springing from the centre or border of a flat wart; verruca filiformis is a thread-like formation, single or multiple, congenital or acquired, seen often on the face, neck, lids, and ears, as also upon the trunk.

The verruca acuminata ("venereal" or moist wart; condyloma, Spitzenwarzen, fig-wart, cauliflower excrescence, végétation dermique) is simply a warty growth occurring in parts specially subjected to maceration with sweat, venereal secretions, and mucous discharges, such as the genital and anal regions of both sexes. They are flat, acuminate, whitish, reddish, pinkish, or flesh-tinted, sessile or pedunculated masses of vegetations, commonly smeared with a thin, excessively odorous, and offensive secretion. When occurring as a result of syphilis they are highly contagious. They may be single and small or enormously large, increasing in size till they attain the dimensions of a fist. Often also they are moderate in size and enormously multiplied, covering in closely-set ranks the entire penis and scrotum of men or the vulva and perineum of women. They are always highly vascular, and bleed freely when attacked. The causes of these warts are more obvious than those of the other varieties, friction being often effective in combination with the factors set forth above. The causes of warts in gen-

eral are obscure, but it is clear that they are most often encountered in situations specially subjected to contact with the outer world.

Colrat and Crocker still believe that repeated doses of magnesia sulphate, given internally, suffice to relieve troublesome cases of warts in children. Local treatment, however, should always be efficient. The simplest and most advisable method of removal, which is always practised by the author when found available, is erasion by the dermal curette, followed by the application of a caustic; or, what is even better, the application for a brief time over the site of the lesion of a needle connected with the negative pole of an electric battery. They may be also clipped away with scissors, a crayon of nitrate of silver or nitric acid being applied after, or they may be ligated. Saturated solutions of salicylic acid in alcohol may be applied repeatedly to smaller growths; others require salicylated plaster, or the bichloride of mercury, one grain to the ounce in traumaticin or collodion, or tannic acid, or the perchloride of iron. Venereal warts should never be treated by salves. Deodorization may be secured by washings with soap and water and the use of boric acid or chlorinated lotions. Syphilitic warts should always be dusted with dry calomel; those resulting from blennorrhagia may be removed by any of the methods described above, or by the use of astringent lotions, tannic acid, zinc sulphate, etc., followed by dusting with boric acid, aristol, or iodol. Three grains of powdered arsenious acid to the drachm each of mercurial ointment and mercurial plaster will remove the smaller lesions. The popular wart "cure" contains from half a drachm to a drachm of salicylic acid to the ounce of collodion, with half a drachm (sometimes but a scruple) of the extract of cannabis Indica.

Verruca Necrogenica.—The anatomical tubercle, post-mortem wart, or warty tubercle of the skin is a rarely encountered warty excrescence, found usually on the fingers of those who frequently handle decomposed animal matter, more particularly those coming in contact with the dead—anatomists and embalmers. It commonly begins as a vesicular or pustular lesion rising from an engorged base, and may be a purely local disorder or give rise to the well-known sequelæ of dissection-wounds, scarcely to be differentiated from the results of poisoning by ptomaïnes in general—fever, chills, lymphangitis, adenopathy, and other septic phenomena. In the strictly local forms the wart assumes the dry characters of a tubercle or papule of chronic type. They are best treated by local applications of the acid nitrate of mercury; caustic potash; nitric acid; nitrate of silver; salicylic acid; or by curetting, followed by caustics, the last being in most cases the best method to be pursued.

Nævus Pigmentosus.—*Synonyms: Pigmentary mole; nævus pilosus;* Ger., *Pigmentmal;* Fr., *nævus pigmentaire.*

Pigmentary moles are circumscribed congenital pigmentary deposits in the skin, varying in color from a light fawn to a blackish tint, and existing merely as such or in connection with hypertrophy of connective, vascular, fatty, and other tissues, often associated with hypertrophy of hairs as to number, size, and color elements, varying greatly in dimensions from pinhead-sized discolorations, flattened and scarcely if at all elevated, to bean-sized and larger flattened and warty elevations, even at times constituting tumors of the dimensions of a cocoanut or fœtal head. The verrucous form has the uneven warty surface that its name implies; the larger deposits, connected with masses of connective or fibrous tissue, are termed nævus lipomatodes,[1] while those covered more or less with a fine and colored lanugo growth are termed nævus pilosus. "White moles" are merely pigmentary nævi not yet attaining characteristic color. These lesions are found in all regions of the surface of the body, rather more often, however, over the face, scalp, neck, trunk, and genital regions. In managing all such pigment anomalies one should never forget that there is always a scar left after removal of the disfiguring patch, and that, as in the case of warts, when treated after the fortieth year of life they may be followed by epitheliomatous or sarcomatous metamorphoses. The smaller lesions may be removed by electrolysis, by the curette, or by caustics; the larger require the surgeon's knife. The author has successfully employed skin-grafting by the Thiersch method for the prevention of unsightly scarring after complete surgical ablation of a large pigmentary nævus existing upon the cheek.

**Xerosis.**—*Synonyms: Xeroderma; "fish-skin disease;" ichthyosis.*

Xerosis is a congenital dryness, harshness, and roughness of the skin, commonly appearing within the first two years of life, unaccompanied by subjective sensations, and exhibiting to the eye a fine desquamation in the form of rather adherent scales, not very freely shed from the surface of the body, and a characteristic dull grayish, grayish-yellow, or dirt-shaded discoloration, involving all portions of the body, but chiefly the temples and extremities. The treatment is that of the disease next considered, of which it is probably merely a mild variety. The reason for assigning a separate name to xerosis is that in many instances it is found to be not a stage of ichthyosis, but a disease not passing by gradations into the other.

**Ichthyosis.**—*Synonyms: Xeroderma ichthyoides; fish-skin disease;* Ger., *Fischschuppenausschlag;* Fr., *ichthyose; ichthyosis congenita.*

Ichthyosis is a congenital disorder, usually involving the entire surface of the body, commonly aggravated in cold weather and modified in warm atmospheres; characterized by the development upon the

[1] For a remarkable illustration of extreme hypertrophy of this type see the chromolithograph of one of the author's patients in his *Treatise on the Skin.*

skin of epidermal plates coarsely resembling the scales of a fish, and forming in other cases verrucous growths, sessile and pedunculated, freely projected from the surface.

In the simpler forms of ichthyosis, to which the attention of the physician is usually called during the earlier years of a child's life, the surface is merely roughened, harsh, and tessellated with polyhedral dirty-colored plates, coarsely suggesting the hide of the alligator. Sometimes the scaliness is a predominant symptom, and the edges of loosely attached scales may be recognized, the centre depressed. In well-marked cases the condition is always best seen upon the extremities, though all regions of the body are more or less markedly affected. The hystrix variety is much rarer and usually circumscribed, while the simple form is more often universal. In the former papillary, warty, purplish, greenish, or blackish, horny or somewhat fleshy, conical, or club-shaped growths project to the extent of half an inch or more from the surface, often forming a circumscribed patch, the verrucous and corneous lesions having a common base.

In the way of treatment the author has invariably found that the best results follow climatic changes, the temperate being much less favorable to the comfort of the patient than the torrid zones. A single exception in this experience, where the patient suffered much more in summer than in winter, was sufficient to call attention to the difficulty of laying down rules for all cases. Alkaline and vapor baths, soaping and oiling the cornified epidermis, and repeated inunctions of lanoline, oil of sweet almond, benzoinated lard, suet, vaseline, cold-cream salve, glycerin and water, neat's-foot oil, and salves medicated with sulphur, ichthyol, naphthol (3 to 5 per cent.), and the balsam of Peru, are all useful, and in some cases productive of a remarkable temporary improvement in the condition of the skin. All, however, have to be repeatedly and regularly applied at intervals of but a few days; and none are as effective under unfavorable climatic influences as in a mild and uniform atmosphere. The author advises trial of the simpler non-medicated unguents in an effort to select one which seems best adapted to the skin of the individual patient and medicating that slightly. In the majority of patients he has had the best results from salicylated lanoline and suet, equal parts of the latter, with not more than 3 per cent. of the former.

**Onychauxis.**—Onychauxis, or hypertrophy of the nails, is a symptomatic or idiopathic increase of the nail-substance, either in volume or number, with corresponding changes in texture, color, position, and development. The nails may be supernumerary; unusually developed in length, thickness, or breadth; may become opaque, yellowish, dirty-gray, or blackish; be furrowed, "worm-eaten," friable, laminated, or vitreous; be tilted away from the matrix by corneous scales beneath

the free border; or be involved in the serious changes in the matrix and nail-fold induced by syphilis, lepra, the invasion of the trichophyton, eczema, psoriasis, general exfoliative dermatitis, lichen ruber, and almost every one of the grave and extensive dermatoses. The treatment of these several conditions naturally involves the treatment of the disease which has given rise to the hypertrophy and dystrophy of the nail-tissue, the severe and greatly deforming maladies of the nail, for example, occurring under the influence of syphilis presenting the most remarkable pictures of repair when the constitutional treatment of that disease has been properly directed. The use of arsenic, iron, mercury, and the iodine compounds is often followed by the happiest results in the cases where one or more of these articles may be indicated. Locally, the treatment usually involves the macerating, cutting, trimming, or scraping of the affected nail-substance, and the after-application of unguents applied by the aid of cots over the distal phalanges, medicated with salicylic acid, ammonio-chloride of mercury, sulphur, calomel, red sulphuret of mercury, aristol, naphthol, ichthyol, or chrysarobin; or powders consisting of boric acid, hydronaphthol (1 part to 50 or 100 of Fuller's earth), iodol, and in special cases iodoform. Caustics are indicated for treatment of an underlying ulcer, and counter-pressure may be needed when the nail is (and often it is) pushed to one side or the other or tilted upward from the nail-bed. In all cases shoes, socks, and stockings should be carefully adjusted to the feet, and gloves properly selected for the hands.

For ingrowing toe-nail the offending nail-substance should be scraped till the edge of the nail can be removed from the flesh which it is wounding, and antiseptic cotton inserted between. Radical ablation of the side or all of the distorted nail may be practised in extreme cases, or the soft parts may be cut away and the free edge of the nail permitted to grow downward over the side of the digit.

**Hypertrichosis.**—Hypertrichosis, hypertrophy of the hair, hirsuties, hypertrichiasis, polytrichia, or trichauxis is that condition in which the hairs of the body are increased in number or size, or grow in unusual situations, or in normal situations in unusual length or number. Instances of the enormous development of hairs in persons of both sexes over the scalp, face, and body are recorded, some congenital, some acquired; some complicating other diseases (nævus pigmentosus), others symptomatic of sexual peculiarities or of abnormal conditions (pregnancy, sterility, amenorrhœa); and still others due to causes which can scarcely be determined. The larger number of patients applying to physicians for relief are adult women with hairs upon the face (as on lips, chin, and cheeks).

Superfluous hairs are best permanently removed by electrolysis. The usual method is to cut the hair to a length of not more than one-fourth

of an inch, and to grasp it then with a pair of epilating forceps, the patient being placed in a good light and comfortably seated. A tempered jeweller's brooch, bent to a convenient angle or curve, and held in an insulated needle-holder, is then gently insinuated along the hair till the point reaches the fundus of the hair-follicle in which the hair is planted. Parallelism of needle and shaft of hair is, as far as possible, maintained during this delicate and essential part of the process. The needle is then connected with the negative pole of a galvanic battery, a current of from one-half to two milliampères (more or less as required) being passed when the connection is made (usually by the patient herself) by the aid of a sponge connected with the positive pole of the battery. After the current has been flowing for a brief time, varying with the quantity of electricity employed, the size of the hair selected for operation, and the locality where it grows, a fine foam is seen to escape from the mouth of the follicle in the neighborhood of the hair. The pilary filament is then found to be loosened, and may be extracted without exerting much traction upon it. If the papilla of the follicle has been properly destroyed, the hair will not re-form; if the reverse, the growth is almost certain to recur. The details of this operation are differently arranged by different physicians, much of the ultimate success depending upon the skill of the operator. It must not be forgotten in these cases, by the physician who advises an operation, that the hyperæmia induced by the latter may, in case there is a decided *vis a tergo* that underlies the hypertrichosis, produce an increased growth of the hairs in the vicinity of those actually removed by the operator; hence the danger is to be avoided. The best cases for removal are those where the growth of hairs is not surrounded by a fine downy lanugo or stronger hypertrichosis; where the hairs are long and dark, but not short and thick; and particularly where the subject is not in the second decade of life or near this age. Also, it should be remembered that in the cases occuring in women with apparent "bloating," non-pregnant menstrual cessation before the climacteric, and general symptoms of the class suggested, there is eventually often a spontaneous fall of the abnormal hairs, with reduction in the overweight and recurrence of the uterine flow.

Superfluous hairs may be removed also by shaving, epilation, or depilatories, but these, especially the last named, should rarely be recommended by the physician, as they are of mere temporary value, and tend to induce not merely an increased pilary growth as the hairs return, but also to injure the texture of the skin upon which the offending hairs grow. If required, fifty parts of barium sulphydrate may be thoroughly powdered with twenty-five parts each of starch and zinc oxide, rubbed together to a paste. For the barium salt the sulphide of sodium may be substituted.

## Hypertrophy of Connective Tissue.

**Sclerema Neonatorum.**—*Synonyms: Scleroderma neonatorum; scleroderma or sclerema of the new-born;* Fr., *algidité progressive;* Ger., *Sclerem der Neugeboren.*

Sclerema neonatorum is that condition recognized in newly-born infants and in others soon after birth, gradually extending from the lower to the upper segment of the body till it becomes universal, in which the skin becomes tense, cool, indurated, inelastic, and to a degree incompressible and like marble, colored in various shades from a waxy-yellow to a dull whitish hue, the induced rigidity of the body permitting only faint and few of those movements necessary to the life of the child (taking the nipple in the mouth, crying, opening the eyelids, etc.). Respiration becomes slow, the pulse retarded, the temperature subnormal, and a fatal result commonly occurs within the space of one to two days. The disease known as *œdema neonatorum* is similar in its symptoms and fatality, in the latter case the skin being less generally involved and œdematous, filled with a serous fluid, and assuming a livid or purplish, rather than a whitish, tint.

In both cases the indications for treatment are found in the conditions in which these symptoms occur, the subjects being mostly hospital cases, with marked depression of all the vital forces, poorly fed, exposed to cold, and victims of pulmonary, intestinal, or other visceral disorders. Heat artificially and continuously applied, with an environment similar to that provided in the incubator (warmed cotton-wool, with a thermal source outside), and artificial feeding by the use of the tube (sterilized milk, wine-whey, etc.), are essential. Friction of the limbs with warm oil is also to be practised.

**Scleroderma.**—*Synonyms: Sclerema neonatorum; scleroma; the hide-bound skin;* Ger., *Hautsclerom; chorionitis.*

Scleroderma is an affection of the skin characterized in general by infiltration of its substance, followed by shrinking or contraction and impairment of the secreting apparatus, resulting in a characteristic stiffness and hardening of the integument, occurring in diffuse and symmetrical forms, spreading more or less rapidly over the surface in large areas or over the entire body, more particularly the scalp, face, neck, chest, and upper limbs, unaccompanied, as a rule, by marked subjective sensations, though at times itching is a prominent feature and often interfering seriously with the necessary movements of the body, such as the respiratory and locomotor.

The circumscribed form (morphœa, keloid of Addison) is that in which one or more coin- to palm-sized and larger, circumscribed, dead-white or nacreous-shaded patches are found in the skin, often, as in the symmetrical form, in young adults and children and rather more often

in females. The patches are usually surrounded by a delicate pinkish or violet-tinted border; this latter is often recognized on close inspection as composed of a very delicate telangiectasis, the vessels being strictly limited to the peripheral zone. The patch (or patches) is usually limited to one side of the body, and when multiple may be often recognized as following the line traced by the distribution of a nerve-trunk. The surface of these patches is commonly neither elevated above nor depressed below the general level of the integument, and is usually dry, oval or roundish in contour, its contained area being supple and readily gathered between the finger and thumb, or slightly spherical in contour, and having the feel of a firm cushion. The patch may enlarge by peripheral extension or by coalescence with others. In other cases ridges and ribbon-like masses are formed with sulci at the side, the appearance of the skin strikingly suggesting a cicatrix. Occasionally there is marked pain, tingling, or itching in such plaques or cicatriform bands. The regions where they most often appear are the head, the lower limbs, the trunk, and upper limbs. In extreme cases the lesions are numerous, and they have been recognized in all parts of the body. They are most often seen in young adults, chiefly of the female sex, with tendencies to neurotic trouble, anæmia, and malnutrition. (See Plate No. 1.)

Sclerodactylie is that condition in which a contracture, similar to that ensuing in both diffuse symmetrical and circumscribed scleroderma, affects the fingers, which are flexed firmly into the palm, and one or more of the distal phalanges distorted by fixed extension. This atrophic state, following both forms of the disease, and probably due to failure of nutrition of the skin, with subsequent cellular changes under the influence of the trophic nerves, is at times the most conspicuous symptom of the disorder.

Treatment of both forms of scleroderma requires improvement of the nutrition, as with food, cod-liver oil, the ferruginous tonics; the elimination of the causes of the disease, cold externally, thermic variations, and the local application of warm or hot water in shampooings and baths, followed by inunctions with oily and fatty substances. The treatment of the circumscribed form of the disease is less promising than that of the other form, severe and disfiguring atrophic conditions occasionally resulting.

**Elephantiasis.**—*Synonyms: Elephantiasis Arabum; elephant or Barbadoes leg; bucnemia tropica; pachydermia.*

Elephantiasis is a chronic affection of the cutaneous and subcutaneous tissues, often occurring as an endemic disease, due to obliteration of lymph-vessels, resulting in febrile and other systemic symptoms, redness, tumefaction, and infiltration of the affected part, and the eventual production of a well-marked hypertrophy which in tropical countries, where the disease is more often encountered, may eventually

PLATE I.

MORPHŒA, after a Portrait in Oil of one of the Author's Patients.

produce a gigantic hypertrophy. When the scrotum, leg, or other part is chiefly involved, there are frequently inguinal adenopathy and intense pain, with tumefaction of one or more of the external genital organs, lymph often escaping from any solution of continuity. Sporadic cases are occasionally seen in the temperate zones, and often may be traced to local obstruction of the vascular (both blood- and lymph-) channels, or to erysipelatous attacks, grave *eczema e venis varicosis*, and phlegmasia dolens. When the characteristic hypertrophy of marked elephantiasis is attained, the skin has a peculiar rough, glabrous aspect, suggesting the leg of an elephant or the bark of a tree. The greater the dense enlargement, the less the pitting on pressure—a symptom of early occurrence, as in ordinary œdema. In severe cases the skin of the hypertrophied part becomes the seat of degenerative changes, desiccated secretions remaining on the surface mixed with sweat and altered sebum, dermatitis and pigmentation being often present, the former at times inviting to ulceration, and in extreme cases to gangrene. In the "lymph-tumors" and "lymph-scrotum" of authors there is marked lymphatic telangiectasis, and often, when the surface is wounded, a flow of lymph from the surface. It is probable that all parts of the body are liable to the affection, though it is more commonly observed on the lower extremities, the genital regions, ears, superior extremities, and lips. Common complications, more noticeable in the cases of endemic origin than in the sporadic forms seen in this country, are verrucous vegetations, adenopathy of contiguous ganglia, lymphorrhagia sufficient to constitute a severe drain upon the system and, according to the Indian authorities, who have studied such cases with special care, the blocking of the lymph-channels with the parents, ova, and embryos of the *Filaria sanguinis hominis.*

In all cases complicated with fever it is necessary to employ the usual antithermal remedies—phenacetin, acetanilide, the saline laxatives, and effervescing draughts—followed, when these have wrought the result desired, by the administration of the mineral acids, iron, quinine, cod-liver oil, and tonics. Change of residence in the endemic cases is of course of primary importance. The treatment of the larger tumors resulting from the disease is almost wholly surgical, by the aid of bandages to reduce the swelling, elastic pressure, ligation of vessels of supply and of afferent nerves, and ablation of the growths (scrotal, clitoridian, labial) by the knife. The results, in the larger tumors when properly treated surgically, are brilliantly successful.

**Rosacea.**—*Synonyms: Acne rosacea; telangiectasis faciei; nævus araneus; "brandy nose;" "whiskey-nose."*

Rosacea is a chronic affection, chiefly of the face, in which there is displayed a circumscribed or diffuse, light- or dark-tinted, redness of the surface, due to distension of the vascular capillaries, often associated

with the several lesions and forms of acne, usually not the seat of marked subjective sensation, and due to several internally acting or externally exerted forces which tend to congest the surface of the head, such as long exposure to the rays of the sun, freezing the nose and cheeks, burns, chronic dyspepsia, alcoholism, and continued wearing of tight collars at the root of the neck. The two varieties, erythematous and hypertrophic, described by authors, merge by insensible gradations the one into the other. When the venous radicles in the nose, cheek, or elsewhere become simply turgid with over-supply of blood, there is a chronic hyperæmia, leading to over-distension of the vessels, which soon accommodate themselves to the *vis-a-tergo* by becoming larger, more tortuous, and more invasive of adjacent territory. Their radicles soon develop into similarly-sized and distended channels, and there results a new-growth of vessels, a true telangiectasis. The hypertrophic process extends in advanced cases to the connective tissue in the region involved, and there results a new growth made up of vessels, engorged glands, and tumors varying in color from a rosy pink to a deep purplish, bluish, or leaden hue. The affection of the nose termed "rhinophyma" is an hypertrophic form of rosacea with this new growth of vessels, connective tissue, and chronically engorged glands, producing the bulbous and knobbed nasal organ, usually of the advanced stage of chronic alcoholism. In both their pathological and therapeutic relations the greater number of cases of simple rosacea are like those of vascular nævi and of the simple congenital or acquired blemishes (nævus araneus, spider nævus, "spider cancer," etc.), pinkish, reddish, or of a darker shade, seen chiefly in the face, commonly well circumscribed, and recognized on close inspection to be wholly composed of fine branching or tortuous twigs of vessels, the loops of which are visible through the epidermis.

The treatment of these several lesions is, as regards internal management, the removal of all causes recognized in an improper hygiene: abstinence from alcohol, tobacco, strong coffees and teas; the correction of all gastric and intestinal disturbances; the removal of any tendency to lithæmia, obesity, torpidity of the liver, and habitual constipation; and the careful regulation of meals and diet. It is well in all cases, especially those complicated by acne, to avoid hot and Turkish baths, which have a well-marked tendency to congest the skin of the face, and to use instead cool or cold daily ablutions of the skin of the general surface, followed by friction with a coarse towel.

Decidedly the best local treatment is the destruction of the vessels visible in the skin by the aid of a needle connected with the negative pole of a galvanic battery, the simple operation being precisely that described in connection with the treatment of hirsuties or hypertrichosis, already discussed, the needle employed being either the same as

that selected for the permanent removal of hairs, the jeweller's brooch, or a fine but stiffer implement, such as the finest cambric needles, seized in an insulating holder. The insertions should be sufficiently near to one another and sufficiently deep to destroy the continuity of the vessel, a common sign of proper penetration of its lumen being made apparent to the eye by bubbles of gas produced by the electrolytic action, passing even for an inch and more along the radicles in immediate connection with that entered by the point of the needle. The scar is at first punctiform and inconspicuous; later, it frequently wholly disappears in the course of a few months when the rosaceous blemishes have not been large nor too intimately connected with deep underlying vessels. The same results can be less deftly produced by needles heated to a white heat and inserted into the tissue to a depth sufficient to destroy the continuity of the vessels; also by erasion and by hypodermic injection of astringent or caustic substances. Other plans pursued by operators are—incision with a fine-bladed knife, followed by the application of a sharply-pointed crayon of the nitrate of silver; multiple incisions; "cross-hatching" with a many-bladed knife, such as has been employed in erythematous lupus; and "tattooing" with chromic or other acids, into which the points of needles to be inserted into the skin have been dipped. All rosaceous patches with marked acneiform lesions should, when practicable, be treated for relief of the latter before operating. In such cases the sulphur salves, one to two drachms of the precipitated sulphur to the ounce of cold-cream ointment, and the sulphur lotions, stand at the head of the list. Van Harlingen's formula (1 drachm of precipitated sulphur, with 5 grains of powdered camphor, 10 of powdered gum tragacanth, and 1 ounce each of rose- and lime-water) is not only efficacious in relieving the vascular congestion by producing a somewhat astringent effect, but is also valuable in relieving the glandular trouble. The author often uses in these cases a lotion composed of one or two grains of the bichloride of mercury, with a drachm or two of the tincture of benzoin and tolu, to six ounces of rose-water, with a view to producing somewhat the same effect. When hypertrophic forms of rosacea develop, the tumors are best treated by a surgeon, who after skilful ablation is often enabled to cover the resulting wound with skin-grafts after the Thiersch method, or by subcutaneously enucleating the growths, to replace the former covering of the nose in its normal relations.

**Frambœsia.**—*Synonyms: Yaws; pian; parangi.*

Frambœsia is a specific endemic disorder in which, with and without systemic symptoms, there appear (in persons usually resident in tropical countries, more particularly on the western and eastern coasts of Africa, Southern America, Oceanica, and the East Indies), after a period of incubation lasting from two to eight weeks, pin- to bean-

sized and larger papulo-tubercles, which, springing from a broad base, enlarge and undergo a vegetative change. The summit of each tubercle splits, and thus exposes to view a moist, flattish, granulating, roundish, or oval tumor, somewhat resembling a raspberry, from which the disease gets its name. Irregular forms of the disease are those in which there are circinate groups of lesions, coalescence, crusting, offensive discharge desiccating into crusts, ulceration, and involvement of mucous surfaces. The disease is usually relieved in the course of a few months, though it may last for years and death may result from exhaustion, or serious consequences short of those that are fatal may result in the way of distortion or deformity.

The treatment involves the strictest attention to hygiene, a matter in which natives of countries where the disease is endemic are most often at fault, and includes the use of tonics, proper diet, absolute cleanliness and disinfection, and local applications of boric acid in solution and powder; hydronaphthol and fuller's earth, 1 part of the former to 100 of the latter; or iodoform, iodol, aristol, and mercury in salves and powders. The internal administration of mercury and iodide of potassium has been employed in the treatment of yaws, largely under the long-entertained conviction that the disease was in some way related to syphilis. The latter view is now pretty generally abandoned, and the remedies named have been lately esteemed as valuable in this disease only on the grounds upon which they have been administered with advantage in other non-syphilitic maladies.

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## ATROPHIES.

### Of Pigment.

**Leucoderma.**—*Synonyms: Vitiligo; leucasmus; achroma cutis; "piebald skin;" leucopathia.*

Leucoderma is a congenital pigment-anomaly of the skin in which, at the time of birth or soon after, whitish patches or bands irregularly outlined, and usually isolated, appear in the skin of the child, which may respect, as do many other pigment peculiarities, the areas defined by the distribution in the skin of its cutaneous nerves. The pied or piebald skin of the negro is peculiarly liable to display these anomalies of congenital as well as acquired origin. Islands of pigmented integument may often be distinguished in the midst of these non-colored areas. The hairs growing in the whitish patches are also destitute, as a rule, of pigment. The treatment is that of the two disorders next described.

Albinismus.—*Synonyms: Leucoderma; leucopathia; albinism; achroma.*

Albinism is that condition in which there is a congenital absence of pigment, unaccompanied by textural changes in the skin, and involving its entire surface, including the pilary filaments and the choroid coats and irides of the eyes. Individuals displaying this peculiarity have the well-known milky appearance of the skin of the albino—pinkish-white where the epidermis is unusually delicate. Nystagmus, heliophobia, pupillary variations, and other ocular symptoms are common, on account of the absence of pigment in the eye. The subjects of this anomaly are apt to possess a delicate constitution. Many of them are of the African race, but the author has lately photographed two children, perfect illustrations of all the features of the pure albino, who were of Irish parentage and born in the city of Chicago. In a few cases there is a distinct heritage of the pigment peculiarity. The condition is remediless.

Vitiligo.—*Synonyms: Leucoderma; achroma cutis; piebald skin; "white leprosy."*

Vitiligo is an acquired disease of the skin, which exhibits upon its surface one or many well-defined, circular, oval, irregularly-shaped, or recticulated patches, having a milky-white color, without other manifest change in the integument, the hairs growing upon such patches being usually destitute of color. At the periphery of such whitish patches there is usually a hyperpigmented border, varying in color from a light fawn to a deep chocolate, the two processes commonly progressing side by side, with the atrophic areas slowly advancing upon the pigmented border. Like most of the disorders of the pigment of the body, vitiligo is remarkably influenced by the elevation of temperature incidental to the warm seasons, occasionally disappearing in winter to reappear with the spring. This effect is more or less associated with the sweat-function, as even artificially induced perspiration produces a distinct effect upon the patches of non-pigmented skin. Sensation, secretion, and temperature are not changed in the affected areas.

The treatment of leucoderma, albinismus, and vitiligo is unsatisfactory. The end to be attained is one relating wholly to comeliness, and not to health; failure therefore of therapeutical measures is by no means as disastrous as in diseases of a different class. The internal remedies most in vogue are arsenic, the ferruginous tonics, the mineral acids, and the agents in general employed to improve assimilation and nutrition. Locally, it is a matter of some doubt whether, except as a curious and apparent exception to the rule, pigment is ever wholly restored to a cutaneous patch from which it has been wholly, not apparently, swept away. To remove the hyperpigmented patches at the

border of the whitish spaces the treatment is that of the disorders considered in the section on Hypertrophies of Pigment. The patches may be stimulated with bichloride lotions, one to two grains to the ounce, or shampooed with green soap in tincture. Sympson of Lincoln[1] has recommended tattooing of the white patches in such cases.

**Canities.**—*Synonyms: Grayness of the hair; hoariness; atrophy of the coloring matter of the hair; hair-blanching; trichonosis cana; trichonosis discolor.*

Canities is a premature or senile, partial or universal, decolorization of the hair as the result of a process which produces a lighter shade than that observed previously in the same individual in different conditions, the change varying from black or brown through every gradation to the whiteness of wool. This may be physiological or pathological, and occur symmetrically, as in the senile state, with a gradual change from a dull-gray to a silvery white; or be of relatively rapid occurrence; or be limited, as a congenital peculiarity, to a single tuft or lock in one region of the scalp, pubes, beard, or axilla; or be premature and general. In the cases last named, occurring usually in young adults, there is a partial change of the hairs, usually over the vertex most prominently, into a dirty-hued, dull-shaded gray. These cases are exceptions to the rule, based upon observation of physiological hoariness, in that often the scalp is found to be in a morbid state, covered with the desiccated secretions of a seborrhœa, an alopecia furfuracea, or a chronic eczema. It has already been mentioned that in vitiligo and leucoderma the hairs are commonly white in the decolorized patches. In other cases the individual hairs are checkered in alternations of white or gray and black, brown, or other shades, a singular piebald appearance being induced by these alternations of colors. Oddities of varying types have been produced by the blanching of filaments in irregular lines, bands, or circles, and by singular alternations also in the arrangement of pigmented and non-pigmented areas in the distal and proximal extremities of both medullary and cortical portions of the filament. The sudden blanching of hair in a few hours is fairly well substantiated by cases competently observed. It is probably, however, in all such cases due more to the sudden admission of air to the medullary portions of the shaft than to distinct pigment-changes.

The general treatment of all cases of this class is that described in the paragraphs devoted to vitiligo and its allied anomalies. Iron, arsenic, and the tonics in general may be required in special cases. As a rule, it may be said that the artificial restoration of pigment to a decolorized hair cannot be expected. There is, however, no question that non-pigmented hairs, removed from their follicles,

[1] *Brit. Med. Journ.*, April 15, 1891.

have been replaced by those having more color, as in cases of alopecia following the exhaustive fevers. The whitish and slender filaments succeeding to the smooth bald patches of alopecia areata are always, in healthy young subjects, succeeded by properly pigmented, and usually by even vigorous, hairs. Hypodermic injections of $\frac{1}{10}$ of a grain of the nitrate or muriate of pilocarpine, gradually increased to not more than $\frac{1}{4}$ of a grain, may be tried in appropriate cases. The most satisfactory remedies are those addressed to the malady underlying the objective disorder in alopecia areata, and to the removal of the seborrhœic state or eczema of the subject of adult years or near puberty whose canities is of the dirty-grayish shade described above.

In all other cases the remedy is dyeing, the dyes commonly employed containing silver, lead, and iron. The chief objections to their use are the poor artistic effects resulting, the discoloration of the scalp produced by the dye, the somewhat disagreeable appearance produced when the dye has been too long discontinued and the undyed hairs have carried the dyed portions, by the process of natural growth, a short distance from the follicle, exhibiting thus a sharp contrast between the colored and uncolored portions; and, lastly, the general "messiness" of the procedure. The author has employed with good results in these cases the device of Anderson, using first over the hairs to be colored a solution of bichloride of mercury, 2 grains to the ounce, and following this with a solution of hyposulphite of sodium, 1 drachm to the ounce, a fairly good black shade resulting. Other dyes are, for a black shade—

℞. Argent. nitrat., grs. xv;
Ammon. carbon., grs. xxij;
Unguent. adipis, ℥j.—M.

Or, if a lotion is preferred—

℞. Argent. nitrat., ʒj;
Plumb. acetat., grs. xv;
Aquæ Cologniens., ad fʒiij.—M.

To obtain a brown shade—

℞. Acid. pyrogallic., grs. xv;
Aquæ Cologniens., ʒss;
Aquæ ros., fʒjss.—M.

## Atrophy of the Hair.

**Alopecia.**—*Synonym: Baldness.*

Alopecia is a term employed to designate the forms of baldness occurring in any disease as a symptom of the latter, or, as far as may

be determined, occurring as a purely local affection of the follicles in which the pilary filaments are lodged. It may be universal or partial, congenital or acquired, physiological or pathological, symmetrical or asymmetrical, and result in a mere gradual thinning of the pilary growth of one region or in a sudden removal of every filament of hair from an affected patch, leaving the surface formerly covered absolutely denuded of its normal growth. It may result from a large number of systemic affections, including the exanthematous and other fevers, syphilis, lepra, traumatism, nervous disease, and even gout.

Patients exhibiting congenital alopecia are occasionally seen in public dermatological clinics, but rarely observed elsewhere. Several such have been presented lately to the author's observation, and one was made the subject of some comments in a recently published lecture.[1] The baldness is usually partial, and largely limited to the scalp. In the case of two children seen by the author there was an alternation, in a large family, of the birth of congenitally bald and other children unaffected with hairy anomaly. In one case the baldness was total in a child of eight years, save for a single long whitish lock growing from one side of the smooth scalp.

In idiopathic premature alopecia the baldness begins, usually symmetrically, at or near puberty more often in male patients, the hairs which fall being at first replaced by those of a finer and weaker texture, till none are reproduced, and the hair-follicles fall into complete atrophy, the thinning being usually seen advancing on either side along the central crest of the frontal bone. At other times the disorder produces its marked effects first over the vertex. Often there is a coincident alopecia furfuracea, with or without pruritic, and sometimes with slight hyperæmic or even inflammatory, disorder of the scalp; at other times there are seborrhœic symptoms of pronounced grade.

Coming on more often decidedly in the male sex, senile alopecia, at almost any period of human life when its degenerations become apparent, is symmetrical, and, though affecting all the hairy regions, is most conspicuous upon the scalp. It is a symptom of advancing years far more often noted in civilized society than in the races of men living in more or less primitive states.

Symptomatic premature alopecia is mild or severe, sudden of occurrence or gradually extending, and temporary or permanent, and always depends upon some recognized disorder outside of the scalp or region affected with the loss of hair. It is usually symmetrical, though not always, and may originate in a number of causes briefly hinted at above, such as the febrile affections, disorders of the viscera, such as the lungs and kidneys, skin diseases (seborrhœa, eczema very rarely,

[1] *International Clinics*, Philadelphia, 1891.

psoriasis rarely), syphilis, lepra, and the disorders produced by the incursions of the vegetable parasites, such as favus in particular, which is often followed by permanent loss of hair.

The treatment of congenital and senile alopecia is in the majority of cases hopeless. Where the hair-sacs are atrophied or have never been active in producing pilary filaments, no results can as a rule be expected. All the forms of alopecia dependent upon constitutional and local disorders, not an essential element in the hair-loss, are of course to be combated by removing the cause of the disease, and the more effective the one the more speedy and brilliant the result in the other. For example, there are no forms of baldness more remediable than the conspicuous patches of alopecia seen in early syphilis, where the growth of the hair is almost invariably speedily restored by the treatment of the systemic condition alone. At the same time, there are many remedies employed to great advantage with a view to the restoration of the growth of hair in several if not all of the general and other disorders liable to result in baldness. Among these remedies may be prominently placed iron, strychnine, phosphorus, arsenic, and, especially when there is harshness and dryness of the hairs remaining *in sitû*, cod-liver oil. The use of oil-cake by the stock-breeders when the hides of their cattle look impoverished is as general as it is effective, and furnishes a hint to the therapeutist that cannot be overlooked. The author uses with increasingly good results pure Norwegian cod-liver oil in many of these forms of idiopathic and symptomatic baldness, and it is not to be despised in treating even the disorder most amenable to the so-called specific remedies. He also insists in these cases upon the great care to be taken in the hygienic management of the skin of the general surface of the body, believing that it is in accordance neither with the dicta of science nor the suggestions of common sense to weaken the tone of the skin in general when endeavoring to promote the healthful functions of a small part of its surface. All Turkish and other hot baths are therefore discarded, and the general surface is douched or sponged daily from head to foot in cool or cold water containing a quarter of a pound of common salt to the gallon, and followed by brisk friction with a coarse towel or flesh-brush. Exceptions are made of course during the menstrual epoch and for delicate women. In the sex last named great stress is also laid upon the proper aëration of the scalp, the hairs remaining on the scalp being loosened from the coils or braids, and suffered for a time daily to hang loosely over the shoulders, while light and air have access to the scalp. With regard to cutting the remaining hairs when there is relative baldness, it is the rule never to sacrifice the hair of a woman needlessly, nor to encourage the too frequent and too radical clipping of the hairs of the head of the other sex. But it is not to be forgotten

that when a scalp is more or less thinly covered with hairs that are dying in their follicles, and falling, lustreless, friable, and desiccated, there is an unquestionable improvement produced in the majority of cases by making a clean sweep of the surface with razor or scissors, and awakening the entire crop to activity by a simultaneous exposure to light and air of the orifices of all the hair-follicles. It has indeed occurred to the author that in many of these cases the apparently mysterious improvement resulting is due in part to the enforced exposure of the entire scalp to the sunlight and the air—a species of reversion to the conditions of early life which is not slow to make itself felt in improved prospects for the future. Attention is called here, as before in these pages, to the possibilities, especially in the case of women near middle life or later, after removal of all the hairs from the scalp by the aid of the razor, of the production of a new and more vigorous growth which displays either a premature grayness or a color several shades lighter than that of the crop sacrificed. It is as a rule better, in removing the hairs of women, to clip or cut them short rather than to shave the scalp (considered solely from the point of view of the therapy of alopecia), and to shave the scalp of men only when it is more or less imperative. It is scarcely ever requisite to resort to either of these procedures for syphilitic alopecia; the cases in which it is productive of decidedly the best results are those of premature idiopathic baldness in either sex.

The local therapy of alopecia by the aid of medicaments includes the use of shampooing, of lotions, and of salves, the latter used with a view to producing stimulating, antiseptic, or parasiticidal effects. A shampoo, for the purpose of cleansing and stimulating the surface, is secured by the aid of one of the hard soaps with water; by the use of the tincture of green soap (most dermatologists use the Hebra formula for this purpose—2 ounces of the sapo viridis, digested with 1 ounce of the rectified spirits of wine, and scented with lavender) or with a diluted tincture of soap, the diluent employed being usually spirit of cologne or rose-water. It is usual to wet the surface to be shampooed thoroughly with hot water, then to add a sufficient quantity, from time to time, of the soft or hard soap, or of the solution of the same, to the wet surface; and after cleansing the surface well with the foam or suds produced to wash clean in soft water, and then to dry thoroughly. After such shampooing with an alkaline detergent it is usually necessary to anoint the surface well with a pomade or unguent, or to apply a lotion which will, in addition to any therapeutic effect, tend to prevent the dryness and harshness produced by the washing.

In other cases the method more lately employed by Lassar and Groetzer may be employed. The head is first washed well with tar soap for ten minutes, then cleansed with lotions first of hot and then of

cold water before it is well dried. A solution of corrosive sublimate, 1 : 900, in equal parts of water, glycerin, and eau de Cologne, is well rubbed in, and after this a solution of naphthol in absolute alcohol, 1 : 200. The pomade used after this contains 2 parts of salicylic acid and 10 of tincture of benzoin to 100 of neat's-foot oil. The course here laid down is pursued daily for one or two months.

The methods of the French are well illustrated in the process employed by Quinquaud. The hair is first clipped short, and there is a night and morning shampooing with soap and water, followed by a lotion, as follows:

℞. Hydrarg. biniodid., gr. iij;
Hydrarg. chlorid. corros., gr. xv;
Spts. vin. rectif. (90 per cent.), ʒvj;
Aquæ destillat., fʒviij.—M.

This is also washed off, and one of the following liniments, in alternation each for eight days, well rubbed into the surface:

℞. Balsam. Fioravanti,
Spts. camphor., āā. fʒiiiss;
Aquæ ammon., fʒiss.—M.

℞. Balsam. Fioravanti,
Spts. camphor., āā. fʒiiiss;
Tinct. pyrethri, fʒiss.—M.

Every sixteenth day the following is applied:

℞. Acid. chrysophanic.,
Acid. salicylic.,
Acid. borici, āā. gr. xxx;
Vaselin., fʒiiiss.—M.

Other preparations are as follows:

℞. Acid. carbolic., gr. xv;
Glycerinæ, fʒij;
Aq. Cologniens., ad fʒj.—M.

To be applied with a Barnes' dropper between the hairs along the "parts" made by a comb, and rubbed in by the aid of a soft brush like a tooth-brush (Van Harlingen).

The Sarg fluid soap is an exceedingly useful adjuvant to the list of articles to be employed in shampooing, the chief objection to it being the need of thoroughly removing with water the sticky collection remaining in the hair after its use. In compounding pomades for

hairy regions it is to be remembered also that though lanoline, the usual "cold-cream salve," and others of the same class are often needed as bases, the petroleum products are here rather more desirable, as they leave the surface less cumbered with a greasy material clinging to the pilary filaments. Most of the highly-vaunted proprietary articles sold in the shops depend for their value upon the corrosive sublimate which they contain, and which may be applied as in the following formulæ:

℞. Hydrarg. chlorid. corros., gr. v;
Spts. vini rectif., ʒij;
Glycerin., ʒss;
Aquæ rosæ, ℥vj.—M.
Sig. For use upon the scalp.

℞. Hydrarg. chlor. corros., gr. ss;
Tinct. cantharid., fʒij;
Glycerin., fʒss;
Olei rosæ, q. s.—M.

Other applications of value are—

℞. Resorcin., ℈ss–℈j;
Ol. amygd. dulc.,
Tinct. cantharid., āā. ʒij–ʒiv;
Spts. rosmarin., ℥j;
Aquæ Cologniens., ad fʒvj.—M.

℞. Ol. rusci (*vel* picis liquid.),
Ol. lavandul., ʒj;
Ol. pinus sylvestr., ℥vj.—M.

℞. Acid. chrysophanic., ℈ss;
Glycerin., ℥xj;
Vaselin. alb., ʒvij.—M.
(*Anderson.*)

Other articles, useful more especially where the alopecia is due to syphilitic infection, are—

℞. Hydrarg. chlorid. ammoniat., ℈ss;
Balsam. Peruvian., ♏x;
Vaselin., ℥j.—M.

℞. Hydrarg. sulph. rub., grs. ij;
Sulphur. precipit., ʒj;
Vaselin., ℥j.—M.

The great advantage of sulphur in the disorders of the sebaceous gland is not to be forgotten when treating an alopecia which from first to last may almost wholly depend upon constipation or other functional disorder of these organs often remediable by the sulphur preparations. One to two drachms of the precipitated or other preparation of sulphur may be added to the ounce of salve-basis.

Change of climate has an unquestioned effect of value upon the nutrition of the skin and hair, and is not to be forgotten as a remedial resort in cases in which such an aid to recovery can be secured.

ALOPECIA FURFURACEA.—*Synonyms: Alopecia pityroides capillitii; pityriasis capitis; seborrhœa capillitii; pityriasis simplex.*

This is a form of baldness often associated with all the symptoms and produced by the causes of the forms already described. There is present, however, more than a mere atrophy of the hairs: the latter symptom is here associated with a disorder of the scalp marked by hyperæmia, itching, scaling, and exfoliation of dry or fatty scales from its surface. It may be acute or chronic in course, and produce a dryness, brittleness, and lack of lustre in the hairs, which finally fall and leave the surface partly or wholly deprived of hirsute covering. The general and local treatment is that of simple alopecia. Pincus, who has given special attention to this subject, and who regards it as produced by a vegetable fungus fructifying with flask-shaped pores, uses by preference corrosive chloride of mercury locally. Others, as before indicated, employ locally tar, sulphur, the oil of savin, ichthyol, resorcin, and tannin. Hypodermic injections of $\frac{1}{6}$ grain of pilocarpine have been also used with success. The author believes that many of these cases may be relieved by methods less harsh than those often suggested. He first orders one of the preparations described above as a shampoo, preferably the Sarg soap, which is less irritating than others; then, after drying, a corrosive-chloride lotion not stronger than 1 : 2000 in a 50 per cent. solution of rectified spirit of wine and water. The scalp is lastly anointed with a pomade containing to the ounce of "cold-cream vaseline" (one of the former to ten of the latter) 20 minims of tincture of benzoin and 10 of balsam of Peru. In severe cases, not yielding to the usual treatment, the oil of cade may be added, 1 part to 10 parts of olive oil and 2 parts of the oil of benne; or a salve of the ammonio-chloride of mercury may be used, 3 to 5 grains to the ounce of salve-basis; or a 5 per cent. oleate of mercury rubbed up with equal parts of vaseline. When the seborrhœic process is very conspicuous in the scalp the sulphur preparations are always indicated.

ALOPECIA AREATA.—*Synonyms: Area Celsi; tinea decalvans; pelade,* Fr.; *porrigo decalvans; alopecia circumscripta.*

Alopecia areata is that condition in which suddenly or slowly one or

several, usually asymmetrically distributed, patches of baldness appear upon the hairy regions of the body, more often upon the scalp and parts covered by the beard, the patches being either not larger than the head of a pin or so extensive, after multiplication and coalescence, as to include the entire surface of the body. When the patch is characteristically denuded, the region once covered with hairs is usually compared in smoothness to a billiard ball. It is apparently whiter than normal. The denuded surface is sometimes less sensitive than the periphery; often seems less full than, and even depressed below, the healthy tissue in the vicinity. The hairs left *in sitû* in the perimeter of the bald patch are usually readily removed by epilating forceps, and exhibit atrophied roots, unless the case be improving, when they remain almost if not quite normally firm in the hair-pouches. The disease is occasionally complicated with ringworm of the scalp, dehiscence of the nails, and syphilis. It may be produced by traumatism of the head (as blows upon the scalp), nervous shock, and neurasthenia. Many dermatologists are disposed to believe that the name commonly given to the disease includes also cases originating in an invasion of the hairs by a parasite, as originally taught by Gruby. The exact characters of such a parasite have not yet been satisfactorily determined.

The treatment of alopecia areata in general may be described as practically that of the other forms of baldness. Arsenic, strychnine, phosphorus, the ferruginous tonics, cod-liver oil, and the several methods of recognized service in restoring strength to the system are often required in these cases. It is idle to say that treatment of this sort is without value, when the enormous majority of patients who completely recover under the treatment of physicians have employed remedies of this class, and when the so-called local-stimulant method of treatment is proved to possess no value in forms of the disease that have proved remediless.

External treatment by stimulation is to be tried in all cases, and the result, though uncertain and tedious, is favorable in the majority of cases, and may be always hopefully looked for when the patient is under thirty years of age. The articles chiefly employed are cantharides, alcohol, ammonia, mercury, sulphur, quinine, tar, naphthol, green soap, rosemary, petroleum, and carbolic acid. Shampooings, certainly in the early stages of the disease, are usually first practised, and followed by the application of one of the articles named above, in the form of either a salve or lotion, till a decided rubefacient action is produced. The salves are preferable after shampooing, and lotions in the intervals of such dressings. The author, however, advises in all cases when the disease is manifestly improving, and the whitish or grayish-white hairs slowly replacing those that have been lost, not to

push too far the stimulant treatment, but to be content, when all is thus promising well, with a gentler cleansing of the surface and a more frequent inunction of the scalp with oily preparations.

The following are among the formulæ employed by authors for local purposes:

℞. Tinct. cantharid.,
Tinct. capsici, *āā.* ℥ss;
Olei ricini, ℥ss;
Aquæ Cologniensis, f℥j.—M.
(*Van Harlingen.*)

℞. Chrysarobin., ℥ss;
Ol. olivæ,
Lanolin. (puriss.), *āā.* ℥ss.—M.
S. To be well rubbed in night and morning.
(*Crocker.*)

℞. Ol. amygd. dulc., f℥j;
Tinct. capsici, f℥ij;
Liq. ammon. fort., f℥j;
Spts. rosmarin., f℥v;
Ol. limonis, f℥j.—M.
S. For use over the scalp with friction.
(*Wilson.*)

Faradization of the scalp with a stiff wire brush; blisterings, repeatedly produced over patches of a relatively moderate extent; corrosive-sublimate washings, after shampooing, 1:1000 or stronger, carbolized oil, oil of mace, croton oil, ether, turpentine, and creasote, have all been employed with success in the management of these cases. The supporters of the parasitic theory of the origin of the disease largely employ the sulphur preparations with good reported results.

**Atrophia Pilorum Propria.**—Atrophy of the hair may be of either symptomatic or idiopathic origin, and affect the long or short hairs, be local or generalized, and, as regards individual hairs, affect either the entire shaft or portions of the latter, and this with either regular or highly irregular distribution along the filament. Hairs affected with disorders of this class are usually lustreless, brittle, fibrillated, readily cleft, and readily fractured. The regions affected usually display the broken stumps of hairs *in sitû*, or blackish points representing the section of hairs removed from the surface at the plane of exit from the follicle. A number of affections, not completely understood as yet, are to be classed under the title of idiopathic atrophy of the hairs,

setting aside the forms symptomatic of syphilis, renal disease, and tuberculosis. Among the former may be named FRAGILITIS CRINIUM, in which the hairs split into numerous fibrillæ, the cleavage being recognizable as far as to the root in many cases, the fibrils often curling in several turns away from the axis of the shaft. TRICHORRHEXIS NODOSA is presumably another form of atrophy, affecting more often the male beard, though the author has observed it repeatedly upon the scalp in male subjects, where several irregular thickenings resembling nodes can be recognized on each shaft, the hairs often breaking with a "green-stick fracture" immediately through the node. MONILETHRIX (displaying moniliform or beaded hairs) is an affection of probably the same general character, in which nodes can be seen strung regularly or irregularly along the hair-shaft, its internodular portions relatively colorless, atrophied, and thinned. As distinguished from trichorrhexis nodes, a fracture occurs through the thinned and apparently non-pigmented portion of the shaft, the pigmented node representing what is thought to be nearly normal hair-tissue. TINEA NODOSA, a nodose condition of the hairs of the moustache accompanied by thickening, roughness, and some fragility; LEPOTHRIX, a condition in which the hairs of the axillæ or scrotum are fringed with feather-like masses along the shaft; and PIEDRA, a condition in which blackish and very dense nodes are seen upon the hairs,—are all probably the results of parasitic invasion of the hair-shaft, with a resulting atrophy.

The treatment of all these forms of disease is to be conducted, after the use of such parasiticides as may be indicated by any spores or fungi present, by clipping or shaving of the hairs, followed by shampooings with green soap and water, and stimulating lotions or salves, precisely as in the management of the ordinary forms of alopecia. There can be no question that in many of these ailments the general nutrition of the body is at fault, and should be improved. Van Harlingen praises the use of a salve containing 16 grains of zinc oxide and half an ounce of the flowers of sulphur to the ounce of lard. Crocker recommends solutions containing 1 part of the bichloride of mercury in 1000 parts. Change of climate is advised by some authors; faradization with the metal brush is useful in many instances. The author has seen a few cases which seemed to him to depend upon the singeing of the hair—a procedure, lately made fashionable chiefly by American barbers, which should be abandoned in all affections of this class.

### ATROPHY OF THE NAIL.

**Atrophia Unguis.**—Atrophy of the nails, exhibited in pitting, brittleness, furrowing, thinning, crumbling, etc., may be symptomatic of such disorders as lepra and syphilis, or be idiopathic. Many such

cases are really tropho-neuroses, with symmetrical disorders of nutrition of the nails of both hands and of both feet. Often an apparent hypertrophy of the nail, where a roughened mass of nail-substance in excess fills the space between the anterior upper margin of the distal phalanx of the digit and the free border of the nail, is a disease in which the atrophic process later becomes the more conspicuous and deforming. The presence of air between the nail-lamellæ often produces "white spots" on the nails, the cause being obscure, but probably due to weakness of the fibrous structure of the nail. All the symptomatic atrophies of the nail are to be treated with a view to the management of the disease under whose influence the affection originates. Both these, however, and the idiopathic group of affections, are well managed by frequent scrapings of the nail-substance when it is "worm-eaten," crumbling, friable, or distorted, followed by shampooings with the tincture of green soap and water repeated nightly, and a subsequent dressing of the fingers with wax or a cot, inside of which may be applied a lotion or salve. Of the former may be named bichloride of mercury, in the strength of 1 : 2000 in tincture of benzoin; or among the latter, mercurial salves, the ammonio-chloride, 1 to 2 grains to the half ounce, or sulphur $\frac{1}{2}$ drachm to the ounce of salve-basis; or one may use, where the nail is simply weakened and thinned, fatty substances (lanoline and oil) kept in contact with the nail-bed in the night, while during the day the extremity of the digit is protected with wax.

The congenital atrophies of the nail (imperfectly developed fingers or toes) are remediless.

## Atrophy of the Cutis.

**Atrophia Senilis.**—In the old age of the skin the whole or a part of the covering of the body may participate in the senile changes. The integument then loses in part its fulness, elasticity, and fat, becomes wrinkled, pallid, yellowish-gray, or even darkly pigmented, and sprinkled here and there with flattish, dirty-brown, warty growths, which are exceedingly liable to undergo an epithelial metamorphosis. The condition is to be treated only on the basis of the recognition of its pathological character; that is, by efforts to improve the nutrition of the body, which exhibits a premature nutritive deficiency. The surface may also be anointed from time to time with a fatty substance, such as lanoline, olive, or other oil. The dark discoloration may often be temporarily relieved by polishing the surface with a bit of fine flannel on the finger, aided by pumice in powder or fuller's earth.

**Atrophia Maculosa et Striata.**—Atrophic striæ and macules may be developed either symptomatically or idiopathically in the skin. They appear as delicate whitish spots, streaks, patches, bands, or scar-

like irregular marks, where the skin is obviously thinned, varying in shape and dimensions. Occasionally they exhibit a bluish-white tint. They are found more often on the inferior than on the superior segment of the body, and occasionally observe the lines or areas of distribution of the cutaneous nerves. The lines rarely exceed a few inches in length; the spots have about the variations in size of vaccine scars, which they not remotely resemble.

KRAUROSIS OF THE VULVA, first described by Breisky, instances of which have been observed in this country by two writers (Heitzmann and Ohmann-Dumesnil) besides the author, is a shrivelling of characteristic type, affecting the vulva and adjacent parts. Cases are also on record of DIFFUSE IDIOPATHIC ATROPHY of the skin, UNILATERAL IDIOPATHIC CUTANEOUS ATROPHY, and congenital forms of the same disease. The author has seen a CONGENITAL ATROPHY of the integument affecting the skin covering the hip and buttock of a male patient in vigorous health. The symptomatic atrophies in striæ and other forms are well illustrated by the *lineæ albicantes* seen on the abdomen and thighs after pregnancy or distension of the abdomen from other causes in both sexes. They also follow, with degeneration, the involvement of the skin with gummatous, fatty, and other morbid material. All these conditions of atrophy of the skin are practically remediless.

**Blanching Atrophy of the Skin.**—The form of atrophy described by this phrase is that in which the skin of one or more of the superior or inferior extremities becomes stretched, whitish, shining, and exfoliating in delicate flakes, producing an appearance not unlike that of a sheet of mica. There is usually hyperæsthesia of the affected skin. The few cases of this disease coming under the author's observation have been treated by inunctions with lanoline and olive oil.

**Glossy Skin.**—"Glossy fingers" and neuritic atrophy of the skin are terms employed to describe atrophic changes in the skin induced by traumatism or disorder of a nerve in the area of distribution of the latter. The fingers are usually implicated, one or more becoming smooth, glossy, tapering, usually pinkish in color, sometimes mottled in red and white, with a skin especially sensitive to thermal changes and the seat of neuralgic sensations. The hair-filaments are usually lost, and the nails of affected digits changed, the latter becoming at times curved, notched, or tilted from the nail-bed. Hyperidrosis has been observed in these digits. The absorption of the panniculus adiposus from beneath the skin of the part leaves the fingers or toes tapering and pointed.

Often the parts thus affected spontaneously recover their normal appearance when properly protected from cold, which is often the cause of the mischief, though it may result from the more serious systemic

conditions found in lepra, zoster, and diseases of the spinal cord. But even in the absence of the latter the author has seen cases of glossy fingers which had been for a long period of time under skilled treatment without avail.

**Perforating Ulcer of the Foot** (malum perforans pedis; *mal perforant du pied*) is an affection somewhat rare of occurrence, undoubtedly due to a neurotic change in the foot, and occurring after traumatism, or due to centric disease of the nervous system (ataxia, Friedreich's disease, etc.), to systemic disorders, such as tuberculosis and syphilis, or to excentric lesions of nerves. The most common site of the affection is the plantar surface of the great toe over the metatarsophalangeal articulation, where a sinus forms leading down to the bone beneath. The treatment is surgical, by thorough erasion and antisepsis, and by dressing with hydronaphthol, iodol, or pure boric acid. Several cases have been thus relieved in Chicago, the patients coming from India.

**Ainhum** (pronounced "*ainyoon*").—Ainhum occurs only in American and African negroes and among the natives of India. There is first seen a furrow about one of the toes, usually of the little toe, occasionally of more than one toe, and limited to the line of junction of the digit with the plantar surface. The furrow deepens, apparently constricting the organ, till, either as a result of the constriction or by surgical procedures necessitated by the same, the toe is removed. One such was exhibited by the author to the American Dermatological Association, contributed by Dr. Da Silva Lima of Bahia, and was made the subject of study by a committee of the Association, which reported that the constriction was probably made by a ligature placed about the digit by superstitious and ignorant individuals of the race chiefly displaying the lesions of the disease. Other experts have, however, described a "rarefying osteitis" as the basis of the disorder. The treatment is by surgical removal of the toe, cures having been effected in the early periods of the malady by a division of the constricting ring.

# NEUROSES AND PARASITES OF THE SKIN.

By MILTON B. HARTZELL, A. M., M. D.

## NEUROSES OF THE SKIN.

In neuroses of the skin we have to do chiefly with alterations of sensibility unaccompanied by any primary change of structure. These may manifest themselves as an exaltation of sensitiveness, *hyperæsthesia cutis*, or as a diminution of the same, *anæsthesia cutis*. At the same time qualitative disturbance of cutaneous sensibility may occur, giving rise to dermatalgia, or neuralgia of the skin, and to pruritus or itching.

Although the dermato-neuroses are unaccompanied in the beginning by structural lesions of any kind, it is to be borne in mind that secondary alterations may, and often do, appear after a time as the result of irritation of the diseased parts through scratching, rubbing, etc.

### Hyperæsthesia.

Hyperæsthesia of the skin is rarely idiopathic, but is usually secondary to disease of the nervous system, central or peripheral, and quite commonly is one of the manifestations of hysteria. The augmented sensitiveness of the skin may be general or confined to certain areas.

Since this alteration of sensibility is rarely a primary affection, the treatment must be directed to the cure or alleviation of the malady of which it is only a symptom. When an accompaniment of hysteria, remedies appropriate to this affection must be administered. In hysterical cases bromide of potassium, in doses of from 20 to 30 grains, may be employed with benefit. Valerian or the valerianate of ammonium may also be prescribed. When dependent upon organic disease of the nervous system, treatment must be addressed to the removal of the primary nerve affection: with the cure of this the cutaneous hyperæsthesia will vanish without treatment being especially directed to it.

### Dermatalgia.

Neuralgia of the skin, likewise known as dermatalgia, usually occurs in localized areas, and manifests itself as sharp, lancinating, burning, or boring pains, which commonly occur in paroxysms. No

alteration of the skin accompanies the disease. The treatment, which should be both local and constitutional, must be varied in accordance with the cause. If the patient is anæmic, iron, either alone or combined with arsenic, should be persistently administered. In cases dependent upon malaria quinine in full doses is indicated. In these cases arsenic may likewise be employed with beneficial effect. If a syphilitic taint is evident or suspected, mercury and the iodide of potassium are to be prescribed. The malady may be of rheumatic origin, and in such cases salicylic acid or the salicylate of sodium will usually relieve the pain. When no cause calling for special treatment can be detected, we should administer antipyrine, acetanilide, or phenacetin, and when these fail to afford relief hypodermic injections of morphine must be resorted to.

Locally, the application of heat, either moist or dry, will frequently be of service in alleviating the pain. Aconite liniment, tincture of belladonna, belladonna ointment, or an ointment containing 1 to 2 drachms of chloroform to the ounce, or morphine in lotion or ointment, are all more or less useful as local remedies. Menthol in alcoholic solution, 10 to 20 grains to the ounce, or in an ointment containing 15 to 30 grains to the ounce, will oftentimes afford marked relief. Sinapisms or blisters applied to the painful part will in some instances answer well. In obstinate cases mild galvanic currents applied over the course of the nerves supplying the part, or faradization of the painful skin, may be tried with the prospect of relief.

## Pruritus.

Pruritus, one of the most important of the neuroses of the skin, is characterized by the single symptom of itching, occurring either over the entire cutaneous surface or limited to certain regions. The itching may be more or less constant, but is apt to occur in paroxysms, being usually much worse at night, so that sleep may be greatly interfered with, and sometimes completely prevented.

No primary structural alteration of the skin is present, but after a time secondary lesions, such as excoriations and thickening, may occur as the result of the scratching to which the skin has been subjected.

In order that treatment of this obstinate and oftentimes distressing affection shall be productive of results, it is of the first importance to institute careful search for the cause, which not infrequently is to be found in disease, functional or organic, of some internal organ. Failure to recognize this origin of pruritus means, of course, failure in its treatment. Disease of the liver, of the kidneys and of the nervous system, and disorders of menstruation and pregnancy are often attended by itching of the skin, either local or general. Disorders of digestion, intestinal worms, and hæmorrhoids likewise frequently

stand in a causal relation to pruritus, and the presence or absence of these should be determined before entering upon treatment.

In those cases in which any of the above-mentioned diseases are present remedies appropriate to their cure or relief must be employed if our efforts at relieving the pruritus are not to be in vain. Having determined the cause of the disease, we may then enter upon its treatment.

The patient's diet is to be regulated with scrupulous care. Tea, coffee, alcoholic liquors of every kind, are to be rigidly abstained from. Pastry, highly-seasoned dishes, shellfish, and cheese are to be interdicted; nothing but easily-digested, wholesome food is to be eaten. Abundant exercise in the open air should be taken, and the patient's manner of life so directed as to favor the proper performance of every function. Care should be taken that the under-clothing is made of some soft, unirritating material, silk being preferable to wool.

Remedies may be administered internally and applied locally for the cure or relief of the itching. When the pruritus is accompanied by disease of the stomach, alkalies and the bitter tonics should be given, or some of the alkaline mineral waters may be employed. If constipation is present, saline laxatives or the bitter waters, such as Hunyadi or Friederichshall, must be given. In chlorotic patients some one of the many preparations of iron, either alone or combined with arsenic in small doses, is to be employed. Diseases of the liver or kidneys must be appropriately treated, and disorders of menstruation are to be corrected.

In those cases in which no disease of internal organs can be found we should employ such drugs as diminish the sensitiveness of the terminal nerves or lower the excitability of the nervous centres. One of the best of these is belladonna, $\frac{1}{4}$ grain of the extract or 10 drops of the tincture being given three or four times daily, the dose to be gradually increased until dryness of the mouth or dilatation of the pupils occurs. Better than either of these, however, is atropine, in doses of $\frac{1}{100}$ to $\frac{1}{60}$ grain, given twice a day, either by the mouth or, preferably, by hypodermic injection. Tincture of gelsemium, in doses of 5 to 10 drops, given every half hour until 1 drachm has been taken or until the physiological effect of the drug is produced, will afford relief in many instances. Pick has found benefit from the use of pilocarpine in $\frac{1}{8}$- to $\frac{1}{4}$-grain doses, which are best given subcutaneously. Carbolic acid, in doses of $\frac{1}{2}$ to 1 grain three times daily, is a remedy of considerable value. The bromides of potassium and of sodium, in 20- to 30-grain doses, are also of use, especially in hysterical subjects.

In some cases decided relief follows the administration of salicylate of sodium, a drachm a day being given, or we may employ salol in 10-grain doses, three or four times a day. Recently trial has been

made of antipyrine with favorable results. Acetanilid and phenacetin may also be prescribed with the view of lessening the sensibility of the cutaneous nerves. Recently ichthyol has been recommended as of value, especially in pruritus occurring at the menopause; it may be given in doses of 3 to 5 grains three to four times daily.

In addition to the foregoing remedies we should administer tonics, such as iron, quinine, arsenic, phosphorus, and cod-liver oil, which, by improving the patient's general condition, favor the cure of the cutaneous affection.

Local treatment, while rarely curative, is of the greatest use in relieving, though it may be only temporarily, the itching, and cannot be dispensed with. Locally, we may employ baths, either simple or medicated, and lotions, ointments, and dusting powders containing various substances which exert a soothing or antipruritic effect. Bathing in hot water, fifteen to twenty minutes at a time, often proves of decided benefit. With the view of increasing its sedative effect upon the skin starch or bran may be added to the bath, or it may be rendered alkaline by the addition of bicarbonate or borate of sodium, 4 ounces to 30 gallons. Sulphuret of potassium, 3 or 4 ounces to the bath, may often be used with good effect. Baths of corrosive sublimate are very efficacious in relieving the itching, each bath containing 1 or 2 drachms of the drug.

After the employment of these baths inunctions with some bland oil or emollient ointment should be practised, especially if the skin is harsh and dry, as is so often the case. For this purpose we may use oleum amygdalæ dulcis, oleum olivæ, vaseline, or equal parts of vaseline and lanolin.

Instead of baths we may use lotions, which are often of great service, particularly where the pruritus is localized. One of the very best of these is carbolic acid, in the strength of 2 drachms to the pint of water. Small quantities of alcohol or glycerin added to the lotion will increase its efficacy. Menthol, 10 to 20 grains to the ounce of alcohol, is another remedy of decided value, often allaying the itching promptly and decidedly. Thymol, $\frac{1}{2}$ to 1 grain to the ounce of water or water and alcohol, is likewise an effective antipruritic. Salicylic acid, 10 to 20 grains to the ounce of alcohol or alcohol and glycerin, may also be employed with good effect. Lotions of corrosive sublimate, $\frac{1}{2}$ to 1 grain to the ounce, are effective in many cases. Recently 3 to 5 per cent. solutions of creolin have been successfully used. Of the tarry preparations, which frequently render good service, we may order the liquor carbonis detergens[1] in the strength of 1 to 3 drachms to the pint, or liquor

[1 Liquor carbonis detergens is made by taking 9 ounces of tincture of soap-bark (quillaia-bark) and 4 ounces of coal tar, mixing, and allowing them to digest for eight days, after which the mixture is filtered and used.—EDITOR.]

picis alkalinus in the same proportion. As after the baths, emollient inunctions should follow the use of lotions.

Ointments of various kinds are also employed in the treatment of pruritus, and occasionally are productive of better results than either baths or lotions. They contain, for the most part, the drugs mentioned above as entering into the composition of lotions.

Carbolic acid, menthol, thymol, 10 to 20 grains to the ounce of vaseline, lard, or equal parts of vaseline and lanolin, are among the most effective in affording relief. A remedy which the author has frequently employed with very satisfactory results is β-naphthol in an ointment of 10 per cent. strength. Besides these, we may prescribe ointments of tar, 1 to 3 drachms to the ounce; of sulphur, 1 to 2 drachms to the ounce; of chloroform, 2 drachms to the ounce; of dilute hydrocyanic acid, 1 drachm to the ounce; of cyanide of potassium, 10 to 15 grains to the ounce; of chloral, 1 drachm to the ounce; of calomel, ½ to 1 drachm to the ounce. Besnier recommends the following as often useful:

℞. Acidi tartarici, gr. xxv;
Amyli glycerit., ℥j.—M.
Sig. Apply to the affected parts.

In the local varieties of pruritus, besides the foregoing lotions and ointments, others specially adapted to each variety may be employed.

In pruritus vulvæ great relief is often obtained from sponging the parts with water as hot as can be borne. In addition to the external application of lotions, these may often be employed with advantage as vaginal injections. Care should be taken not to irritate the parts by the use of too strong solutions. Goodell regards the decoction of tobacco, 2 drachms of the leaf to the pint, as one of the very best lotions in this distressing malady. A lotion containing 10 or 15 grains of borax to the ounce is likewise a serviceable one. A 3 to 5 per cent. ointment of cocaine will in many cases afford marked relief, sometimes lasting for several hours. In this variety of pruritus an examination of the urine for sugar should never be omitted.

In pruritus ani douches of cold water are of great benefit, and should be used every night upon retiring. As in pruritus vulvæ, a 5 per cent. ointment of cocaine is of great value in affording relief, or instead of the ointment suppositories containing ¼ of a grain each may be used.

In that variety of pruritus first described by Duhring under the name of "pruritus hiemalis" internal treatment is of small value, and we must depend mainly upon local treatment for its relief. This consists in the use of lotions, the most serviceable of which are those containing glycerin, and inunctions with soothing ointments.

## PARASITIC DISEASES OF THE SKIN.

THE parasitic diseases of the skin are of two kinds—those due to the growth of vegetable organisms in or upon the skin, the dermatomycoses; and those resulting from the presence of animal parasites.

The causes being perfectly well known, the treatment of these diseases rests upon rational grounds, and consists in the application of such remedies as will destroy or remove the parasite. With the accomplishment of this the diseased parts are speedily restored to their normal condition.

### TINEA FAVOSA.

Favus is due to a vegetable parasite, the *Achorion Schönleinii*, which, growing in the epidermis, the hair, and the nails, causes varying grades of inflammation, alterations of structure, and, when occurring upon hairy parts, partial or complete loss of hair. It is characterized by the presence of variously sized, sulphur-yellow, cup-shaped crusts, having a pecular musty odor, which are found, upon microscopical examination, to be composed almost entirely of the elements of the fungus.

Treatment of favus of the scalp, the most common variety of the disease, consists essentially in the extraction of the hairs in the diseased areas and the subsequent application of parasiticides in the shape of ointments or lotions. As a necessary preliminary to these measures, however, the hair should be cut short in order to facilitate depilation and the application of the remedies employed, and the crusts which cover the parts thoroughly removed. In order to accomplish this latter, the crusts should be soaked with olive oil, oil of sweet almonds, or vaseline for some hours, and, when they have become sufficiently softened, are to be removed by washing with soap and hot water. Poultices of starch containing boric acid may also be applied for the purpose of getting rid of the crusts. The scalp having been thoroughly cleansed in this manner, all the hairs in the diseased areas are to be carefully extracted, along with the apparently healthy ones around the margin of the patches.

As depilation is an exceedingly important part of the treatment, a cure within a reasonable period being next to impossible without it, it should be done with care and thoroughness. By this means a considerable portion of the fungus is removed, and the penetration of the parasiticide into the hair-follicles is greatly facilitated. When the greater portion of the scalp is affected, the hairs may be most readily removed by drawing them between the thumb and the edge of a spatula. The diseased hairs lying loosely in the follicles readily come away, while the healthy ones, being more firmly fixed, remain. In

those cases in which the disease is confined to small patches depilation is best performed by means of a broad-bladed pair of forceps, four to six hairs being grasped at a time, and traction made in the direction of their axes, in order that they shall be extracted and not broken off, as is apt to happen, owing to their extreme brittleness. This depilation is to be practised daily until all the hairs have been removed from the affected parts. Immediately after each sitting some parasiticide lotion or ointment must be thoroughly and energetically rubbed in. A great variety of these exists, but success in treatment depends not so much upon the particular one chosen as upon the manner in which it is employed.

If lotions are preferred, these are best applied by means of a short stiff brush, with which they should be vigorously rubbed in. Ointments are to be rubbed in with the ends of the fingers for ten to fifteen minutes at a time.

Among the very best parasiticides are the various preparations of mercury, and of these corrosive sublimate is the most active. This may be used as a lotion of the strength of 2 to 3 grains to the ounce of water, or water and alcohol. The oleate of mercury, in 10 per cent. strength, is another valuable preparation. Other preparations of mercury which may be used with good effect are the yellow sulphate of mercury, $\frac{1}{2}$ to 1 drachm to the ounce of ointment; the nitrate of mercury, $\frac{1}{2}$ drachm to the ounce; ammoniated mercury, $\frac{1}{2}$ drachm to 1 drachm to the ounce. Lotions of hyposulphite of sodium, 1 drachm to the ounce, or of sulphurous acid, pure or diluted, are also effective parasiticides. Ointments of sulphur or of tar, 2 drachms to the ounce, will also in many cases give good results. Resorcin, in an ointment of the strength of 1 drachm or $1\frac{1}{2}$ drachms to the ounce, is one of the newer remedies which have proved effective.

At the end of five or six weeks all treatment should be suspended and the scalp carefully watched for evidences of the disease. If, as is probable, the crusts reappear, depilation and the application of a parasiticide must be resumed as before, and continued for four to six weeks longer. If treatment is continued in this manner, a cure may be expected within from four to six months.

Even after all evidences of the disease have vanished the patient should be kept under observation for a considerable time, and the scalp examined repeatedly in order that treatment may be resumed upon the slightest reappearance of the malady.

The treatment of favus of non-hairy parts is a much simpler affair. The crusts having been removed with soap and hot water, an ointment of sulphur, 2 drachms to the ounce, should be thoroughly applied once or twice daily. We may also employ tar ointment or oil of cade, pure

or diluted with an equal quantity of olive oil. Or we may use some one of the mercurial ointments previously mentioned.

In favus of the nails as much as possible of the diseased structure is to be removed by scraping and cutting, after which a lotion of corrosive sublimate, 3 or 4 grains to the ounce, or a solution of hyposulphite of sodium, 1 drachm to the ounce, may be applied several times a day.

While external treatment suffices for the cure of favus, yet when the disease occurs in strumous subjects or those debilitated from any cause, the internal administration of tonics, such as iron and quinine, together with cod-liver oil, may be useful.

## Tinea Trichophytina.

Although the several varieties of ringworm are caused by the same fungus, the trichophyton, yet they present different clinical pictures and require somewhat different treatment.

In *tinea tonsurans*, or ringworm of the scalp, the hair should be cut short around the diseased patches, or where the disease is extensive all the hair should be cut close, in order that treatment may be readily and effectually carried out. The head should be washed thoroughly every day with soap and water, or, what is preferable, with a saturated solution of boric acid or a lotion of carbolic acid, 1 drachm to the pint. By means of these washings we may hope to prevent the spread of the disease to parts not yet affected. Instead of these solutions, we may use soaps of tar, sulphur, or naphthol for washing the scalp. The scalp having been thoroughly cleansed in this manner, the diseased hairs are to be carefully extracted in the same manner as has been described in the treatment of Favus. This procedure, although not so necessary as in favus, is yet one of great value, shortening decidedly the duration of the treatment. Depilation is to be practised daily so long as any diseased hairs can be found, and immediately thereafter parasiticide lotions or ointment should be applied.

Of the former we may use one containing 2 to 3 grains of bichloride of mercury to the ounce of water or alcohol, the latter being much more stimulating than the former, and consequently somewhat more active. We may also employ lotions of hyposulphite of sodium, 1 drachm to the ounce, or sulphurous acid, pure or diluted, or oil of cade, alone or mixed with an equal quantity of olive oil. If ointments are preferred—and in many cases they give better results than lotions—we may use those of tar, 2 or 3 drachms to the ounce; of sulphur 2 drachms to the ounce; of corrosive sublimate, 5 grains to the ounce; of ammoniated mercury, $\frac{1}{2}$ to 1 drachm to the ounce; of nitrate of mercury, $\frac{1}{2}$ drachm to the ounce; or of $\beta$-naphthol, 1 drachm to the ounce. An ointment of chrysarobin, 10 to 20 grains to the ounce, is a very effective

remedy, but one requiring much caution in its use on account of its tendency, in many cases, to set up a dermatitis which is often of considerable severity, and which may extend far beyond the point of application. Oleate of mercury, 10 to 20 per cent., is also a valuable remedy. These ointments should be thoroughly rubbed into the patches immediately after the extraction of the hairs. Turpentine applied to the affected parts with friction for five to ten minutes, and followed by the free application of tincture of iodine, will in many instances prove curative. Coster's paste is another remedy of some value, and is made as follows:

℞. Iodi, ʒij;
Olei picis, fʒj.—M.

This is to be painted upon the patch, and allowed to remain until the crust which is produced by the application falls of.

A plan of treatment recommended by Harrison consists in softening the epidermis and hair by liquor potassæ, and afterward applying a solution of bichloride of mercury. The method of procedure is as follows: After cutting the hair short, a mixture of equal parts of liquor potassæ and alcohol, containing 30 grains of iodide of potassium to the ounce, is dabbed upon the patches for five minutes at a time every two or three days, until three applications have been made. Then a second solution, containing 4 grains of corrosive sublimate to the ounce of alcohol and water, is used in conjunction with the first, an interval of ten minutes being allowed to elapse between the application of the two solutions. The conjoined use of these solutions is to be continued at intervals of a few days until a cure is obtained. The length of the intervals between the applications is to be regulated by the amount of irritation produced.

In obstinate cases croton oil, either pure or 1 part to 2 or 3 of olive oil, may be applied with the view of exciting an inflammation of the hair-follicles, and thus destroying the fungus contained in them. This remedy, however, should be used with caution, since it is not always easy to produce just the desired degree of inflammation, and if this be too severe permanent loss of hair may follow. In quite young children it should not be employed. Blistering with cantharidal collodion or painting the patches with glacial acetic acid may also be tried in cases which resist other modes of treatment.

For some weeks after apparent cure has been obtained the scalp should be examined frequently, and if scaliness or broken hairs are found, treatment should be recommenced at once. In cases of doubt as to the completeness of the cure the hairs should be subjected to microscopical examination, by which means the presence or absence of spores can be definitely determined.

In that variety of ringworm of the scalp known as *tinea kerion*, characterized by redness and swelling of the diseased patches, together with suppuration of the hair-follicles, the same lotions and ointments are to be used as in the ordinary form, but they should be reduced in strength in order to avoid increasing the inflammation.

In *tinea sycosis*, or ringworm of the beard, the inflammatory symptoms are much more marked than in the other varieties of ringworm. Owing to the pustulation which frequently occurs, and the oozing of fluid from the hair-follicles, more or less crusting may be present. These crusts should be removed by soaking with almond or olive oil, and washing with soap and hot water. After thorough cleansing of the parts, all the diseased hairs, which lie loosely in the follicles, are to be extracted, and parasiticide lotions or ointments applied. If the inflammatory symptoms are severe, the face being swollen and painful, the milder parasiticides should be used until the inflammation has subsided. Lotions of bichloride of mercury, 2 or 3 grains to the ounce; of hyposulphite of sodium, 1 drachm to the ounce; or sulphurous acid, pure or diluted, may be used in the severely inflammatory cases. Or ointment of sulphur, 1 drachm to the ounce; or of yellow sulphate of mercury, ½ drachm to the ounce, may be applied once or twice daily. After the inflammation subsides these lotions or ointments may be employed in full strength.

In *tinea circinata*, or ringworm of parts devoid of hair, a cure may be readily obtained by the use of the milder parasiticides. The parts should be washed with soap and water to free them from scales, and one of the ointments or lotions already mentioned rubbed in once or twice a day. Tincture of iodine, freely painted over the patch, will in mild cases frequently suffice to bring about a cure. The oleate of copper is another remedy useful in the treatment of ringworm of the body. Unlike ringworm of the scalp, this form of the disease is readily curable.

In *tinea cruris*, a variety of ringworm occurring upon the inner surface of the thighs, accompanied by a considerable degree of inflammation, the eradication of the disease is much more difficult, owing to the favorable condition there present for the growth of the fungus. In this variety of the affection great care should be taken to keep the parts thoroughly clean. Besides the lotions and ointments above mentioned, we may use with benefit the following, known as Wilkinson's ointment:

℞. Sulphuris sublimat.,
Olei cadini, āā. ʒiv;
Saponis viridis,
Adipis, āā. ℥j;
Cretæ præp., ʒijss.—M.

When the trichophyton fungus invades the nails, as much as possible of the disease is to be removed by scraping and cutting the nails, after which they should be freely soaked in solutions of corrosive sublimate, 5 grains to the ounce, or hyposulphite of sodium, saturated solution. A 10 to 20 per cent. oleate of mercury is likewise an efficient application. This form of ringworm is often extremely rebellious to treatment, and requires persistent and thorough application of the remedies.

### Tinea Versicolor.

*Tinea versicolor*, being a parasitic affection, demands for its treatment the application of parasiticides which may be used as lotions or ointments. As the fungus causing it is found only in the most external layers of the epidermis, strong frictions with green soap and hot water will aid materially in the cure of the disease.

In slight cases the daily application of green soap may be sufficient to effect a cure. As a rule, however, it is best to combine thorough washing with the use of parasiticide lotions or ointments. A lotion of hyposulphite of sodium, 1 drachm to the ounce of water, is a cleanly and effective remedy. It should be dabbed upon the patches for ten or fifteen minutes at a time every night upon retiring, the parts having previously been thoroughly washed with sapo viridis and hot water. Corrosive sublimate in a lotion containing 2 or 3 grains to the ounce may be employed in the same manner. When the patches are small and few in number, tincture of iodine, freely and repeatedly applied with a brush until desquamation occurs, will often suffice to cure the disease.

Instead of the foregoing lotions we may apply various parasiticide ointments. The application of ointments of sulphur, 2 drachms to the ounce; of ammoniated mercury, ½ drachm to the ounce; of corrosive sublimate, 2 or 3 grains to the ounce, will usually cause a speedy disappearance of the malady. Salicylic acid is also a useful remedy, and may be employed in an ointment like the following:

| | | |
|---|---|---|
| ℞. | Acidi salicylic., | gr. xv; |
| | Sulphuris præcip., | ʒj; |
| | Lanolin, | |
| | Vaseline, | āā. ʒiiiss.—M. |

These applications should be continued for some time after apparent cure, otherwise relapses will not be slow in making their appearance. The underclothing should likewise be frequently changed in order to prevent reinfection.

As the disease occurs quite commonly in those in ill-health, the internal administration of iron, quinine, and cod-liver oil is often attended with advantage.

## Scabies.

Scabies, or itch, is a parasitic disease caused by an animal parasite, the *Acarus scabiei*, or itch-mite. The acarus, burrowing in the epidermis, irritates the skin, causing various inflammatory lesions, such as papules, vesicles, and pustules, accompanied by itching, usually of an intense character. The treatment should have for its aim the destruction of the acari and their ova and the relief of the inflammation of the skin. The first object is to be attained by the application of some parasiticide, either as an ointment or lotion, and the choice of the particular remedy must be determined, among other things, by the age of the patient and the amount of inflammation present.

In small children or in adults with delicate skin choice should be made of the milder remedies. When the skin is greatly inflamed, as is not infrequently the case, irritant applications should be avoided as much as possible.

One of the most effective remedies for the destruction of the itch-mite is sulphur in an ointment containing 1 to 2 drachms to the ounce. Before applying the ointment the patient should be directed to wash thoroughly with soft soap and hot water, or, if the inflammation of the skin is severe and extensive, a warm bath of twenty minutes' duration may be taken instead. This washing or bathing softens the epidermis, and thereby facilitates the entrance of the ointment into the cuniculi or burrows in which the acari are found. The ointment should be applied over the entire body, in order that none of the itch-mites shall escape destruction. The acarus shows a marked predilection for certain localities, as between the fingers, the flexor surface of the wrists, the axillæ, and, in those who sit much, the buttocks. In these situations the remedy should be applied with special care and thoroughness. It must be rubbed in vigorously, in order that it may reach the parasite in the burrows. The ointment should be applied twice a day for three or four days in succession, bathing being omitted during its use. At the end of this period a bath should be taken and the body and bed-linen changed, in order to avoid reinfection. If after three or four days the itching again increases, and new papules and vesicles are found between the fingers, or around the wrists, or in the other situations for which the acarus has a special liking, the ointment should be again applied in the same manner as before. In the majority of cases, if the treatment has been carefully carried out, its renewal will not be necessary.

A method of treatment devised by Hardy, and for some time in use

in the St. Louis Hospital, Paris, will in the majority of cases bring about a cure within a very brief period, but has the disadvantage of causing considerable irritation of the skin. The method is as follows: The patient is thoroughly rubbed with green soap and water for twenty minutes, after which he takes a warm bath of one hour's duration; upon coming from the bath the entire body is rubbed vigorously for twenty minutes with a modification of Helmerich's ointment, the formula for which is as follows:

℞. Sulphuris sublimat., ʒj;
Potassii carbonat., ʒss;
Adipis, ʒviss.—M.

The ointment should be allowed to remain four or five hours. A single application made in the manner described is usually sufficient for a cure, although in some cases a second may be necessary.

Hebra's modification of Wilkinson's ointment, containing sulphur and oil of cade, is another very effective but disagreeable remedy; it is made as follows:

℞. Sulphuris sublimat.,
Olei cadini, āā. ʒij;
Cretæ præparatæ, ʒiiss;
Saponis viridis,
Adipis, āā. ℥j.—M.

It should be applied once or twice daily for three successive days, and allowed to remain on four or five days longer, after which a warm bath should be taken. Vleminckx's solution, diluted according to the delicacy of the patient's skin or the amount of inflammation present, may also be employed successfully in the treatment of scabies; but, as a rule, ointments do better than lotions, since they can be more thoroughly applied.

Styrax is another valuable remedy, particularly useful in the cases occurring in young children and those with delicate skins:

℞. Styracis liquidi, ℥j;
Alcoholis, fʒij;
Olei olivæ, fʒj.—M.

This should be thoroughly rubbed into the skin once daily for several days in succession.

Balsam of Peru, either pure or mixed with an equal quantity of vaseline, is also an agreeable and effective application. As it is devoid

of irritant properties, it is specially applicable to cases in which the skin is much inflamed.

Recently β-naphthol has been highly recommended by Kaposi for the treatment of scabies, and is to be regarded as one of our most valuable remedies. It may be used as an ointment in the strength of 40 to 60 grains to the ounce of lard or vaseline.

Under the name of "compound naphthol ointment" Kaposi advises the following:

| | | |
|---|---|---|
| ℞. | Naphthol., | gr. xl; |
| | Saponis viridis, | ʒiiss; |
| | Cretæ præparatæ, | ʒss; |
| | Adipis, | ℥ss.—M. |

If the skin is much inflamed, it is preferable to use the simple naphthol ointment, as the addition of green soap makes it more irritating. As this remedy is colorless and without odor, it is one of the best to employ in private practice.

Usually, the destruction of the acarus is promptly followed by the disappearance of the itching and inflammation of the skin. Occasionally, however, a veritable eczema may appear, and continue for some time after the cure of the scabies. For the relief of this nothing is better than an ointment of boric acid, ½ drachm to 1 drachm to the ounce.

Finally, it should not be forgotten that many of the ointments used in the treatment of scabies are of themselves more or less irritating, and may give rise to varying degrees of inflammation of the skin, which only disappears upon the suspension of treatment.

## Pediculosis.

*Pediculosis capitis* is to be treated by the application of parasiticide lotions or ointments. The scalp should be thoroughly cleansed with soap and water before applying the remedy chosen. In order to facilitate treatment, children should have the hair cut short. In adults this is not necessary, and in the case of women should always be avoided. For the purpose of killing the pediculus we may use a solution of corrosive sublimate, 1 : 500, but if the scalp is much excoriated this remedy should not be employed.

One of the most effective applications is petroleum. It may be used alone, or mixed with oil of sweet almonds in the proportion of 2 parts of the former to 1 of the latter; or we may employ equal parts of petroleum and balsam of Peru, allowing it to remain upon the scalp three or four hours, and then washing it off.

Lotions of carbolic acid, of salicylic acid, and of tincture of coccu-

lus indicus, are likewise useful. If the scalp is eczematous, as is often the case, ointments are preferable to lotions. We may use ointments of ammoniated mercury, ½ drachm to the ounce; of sulphur; of staphisagria, 2 drachms to the ounce; or of β-naphthol, 1 drachm to the ounce. As a rule, a few careful applications of the above-mentioned lotions or ointments are sufficient to destroy the pediculi. For the removal of the nits or ova we may apply lotions of alcohol, dilute acetic acid, or vinegar, which loosen the ova, so that they can be readily removed by combing. Lotions of carbonate of sodium or of borax are also useful for the same purpose.

In *pediculosis corporis* frequent changing of the under-clothing, in which the parasites live, and bathing, are sufficient for a cure in recent cases. When the disease is of longer standing, besides careful attention to the clothing, which should be thoroughly boiled or baked, we may prescribe lotions of carbolic acid or of thymol, 1 drachm of the former or 10 grains of the latter to the pint. Ointments of staphisagria and of naphthol are also useful. For the relief of the irritation alkaline baths or baths containing starch or bran may be employed.

*Pediculosis pubis* may be readily cured by the application of mercurial ointment; this, however, is a disagreeable remedy, and may give rise to considerable irritation. A lotion of corrosive sublimate is preferable, as it is cleaner and less likely to irritate if properly used. Tincture of cocculus indicus is also a clean and effective application.

# HOSPITAL TREATMENT OF INSANITY.

By EDWARD N. BRUSH, M. D.

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The diagnosis of insanity being established, the question of treatment at once brings forward the important query, Where shall it be undertaken—at home or in a hospital?

In cases the expense of whose care and treatment at home would be a burden too great to be borne by the family or friends the decision is at once necessarily made in favor of hospital care, generally in some public institution. This burden, being thrown upon the shoulders of the public, should be assumed by the State, to remove the conduct of the institutions as far as possible from the machinations of petty politics. In some of our commonwealths the force of public sentiment is fortunately such that the insane under public care have been made wards of the State, and the institutions for their treatment are solely State institutions. In others, alas! the medical supervision of these institutions becomes a matter of party control, and is awarded to the "workers" in political contests or their friends.

It is a curious condition, and one upon which the philosopher might find ample food for reflection, that carefully guards the property of the lunatic, surrounding it with all the safeguards of the law, and permits his person to be relegated for care and treatment—save the mark!—to the lunatic annex of some county almshouse or to the more pretentious State asylum whose medical and nursing staffs change with the variations of political control.

For the independent the question is not so readily answered.

If home care is suggested, it implies in many instances converting the home into an asylum, and the members of the household into active or passive members of the nursing staff. In the majority of instances the patient must be isolated, and this implies a sacrifice of room and conveniences on the part of other members of the family which but few private residences will permit. The employment of at least two attendants is also necessitated, one for day and one for night nursing, and in violent or suicidal cases or in advanced general paralysis a larger corps will often be required. Should the members of the family, from motives of affection or for reasons of economy, assume the duties of nursing in whole or in part, they run risks which are

by no means light. The strain of constant attention and apprehension, the shock to the sensibilities which the acts or language of the patient are likely to impose, added to the burden to the affections already caused by the illness of the loved one, are dangers, by no means small, which the attending physician must carefully weigh before he advises such a course or even gives to it a tacit assent.

In cases in which the insanity is an expression of a neurotic heredity shared by other members of the family, the physician should by no means permit them to attempt the care of the case, or to be brought in prolonged contact with it in any responsible relation. The authentic records of numerous cases of *folie à deux* or *folie communiquée* are warnings against such a course which should not be unheeded. Savage[1] says: "I have seen cases in which an insane brother has started insanity, hitherto unknown in the family, which passed from member to member till three or four had become insane."

There are undoubtedly cases for whom home treatment is suitable, and even desirable. These are those for whom speedy recovery is anticipated, certain cases of insanity following fever, and a few others. Home care, however, should not be undertaken without a systematic course being laid down: plenty of room, so that isolation can be secured without restricting too greatly the movements of the patient, and facilities for unrestricted out-of-door exercise. Few city houses afford these requisites.

## Hospitals for the Insane.

Few general hospitals afford suitable accommodation for the insane, and such patients are, as a rule, declined. At such institutions as St. Luke's, London, La Charité, Berlin, and a few others special wards have been provided, and in these the general routine of treatment does not differ materially from that pursued in hospitals devoted solely to this class.

In large municipalities such an arrangement would afford a ready and convenient receptacle for acute cases, some of whom might remain under care in these wards until recovery, while the cases of prolonged duration could easily be transferred to special asylums, which should by preference be located in the country. Such an arrangement would approach the proposition made to the London County Council to establish a special hospital for the insane, with a visiting staff organized somewhat on the lines of a general hospital staff, and would afford excellent material for clinical teaching in insanity.

The crowding together of a large number of chronic insane with a few acute cases in a city—as is done at the Philadelphia Hospital, for example, and in a few other cities—has no excuse in economy, nor is

[1] *Insanity and Allied Neuroses*, p. 480.

it sustained by any ideas of proper and scientific treatment, to say nothing of questions of humanity.

The special-hospital idea has met no approval from those best qualified to judge. A visiting staff cannot, from the very nature of their duties, become so thoroughly conversant with the varying moods and conditions of their patients, nor can they so well study their physical conditions, no matter how well qualified as neurologists, ophthalmologists, gynæcologists, or general practitioners they may be, as can a thoroughly trained resident staff under direction of a qualified medical superintendent; and, moreover, the need for the thoroughly specialized members of such a staff is much less frequent than many suppose.

The medical care of the insane, as Sir Clifford Albutt well puts it, is much more than mere "bottle medicine." The general routine of administration, the nursing, the classification, the amusements, are all features in the daily life in hospitals for the insane which can be made to tell for good in the progress of the patient, often of more marked and lasting value than mere drugs, and are elements which a visiting staff cannot control and which the interns cannot administer.

Hospitals for the insane are in the United States of three classes: (*a*) public, (*b*) incorporated, (*c*) proprietary.

Public hospitals are State, county, and municipal. But few of the last exist, and these only in large cities, like the asylums on Ward's and Blackwell's islands, New York, and the department for the insane of the Philadelphia Almshouse. State hospitals, as a rule, deserve the title of hospital in some degree, for systematic and careful treatment is the rule in these institutions, except in those which are unfortunately under political control.

Taking the average population of these institutions, 10 per cent. would be a liberal estimate of the recoverable patients under detention at any one time. It is, therefore, evident that the chief function performed by them is as asylums rather than hospitals. A valuable suggestion has been made that in these large institutions a distinct hospital structure be constructed, to remove the curable few from the many who simply need custodial care, that the distinctive medical work of the institution may be concentrated upon these cases. The institution which puts such a plan into operation will undoubtedly reap a rich reward of recoveries. Such hospital blocks are now, according to Batty Tuke,[1] in process of construction, separate and apart from the main buildings, at some of the Scotch asylums, and are to be devoted to curative influences apart from the excitement of asylum life.

County institutions are, as a rule, simply the annexes to almshouses, and are too commonly unfit places either for detention or treatment of the unfortunate insane. Happily, a few States, like New York and to

[1] "A Plea for the Scientific Study of Insanity," *British Med. Journal*, May 3, 1891.

some extent Pennsylvania, have determined to make all the insane under public care wards of the State and are abolishing county institutions.

Incorporated hospitals—the oldest example of which in this country is the Pennsylvania Hospital of Philadelphia, with its insane department in West Philadelphia—are commonly institutions founded by public subscription or private munificence. They are under the control of boards of managers or trustees, and are medically directed by a physician-in-chief or medical superintendent, with a staff of assistant medical officers, all in residence, and usually of more permanent term of service than ordinary hospital residents or interns. These hospitals are intended for both pay and free cases, but do not, with rare exceptions, receive public patients, the free cases being commonly supported by vested funds or from the earnings of the institution.

These institutions have nothing to gain by prolonged detention of patients, as they are not money-making corporations; they are managed upon some established tried principle which does not change with changes either in management or medical direction, and their medical officers are, as a rule, men of established reputation who have been selected to promote the best interests of the inmates of the institutions over which they preside. Witness the names of Bell, Ray, Kirkbride, Nichols, and Butler among the deceased, not to mention equally famous names among the living.

Institutions of this character afford to the unfortunate a home and a refuge undisturbed by the machinations of political tricksters and unshaken by the turmoil of party strife, and may therefore be selected by those seeking a secure and established home for the insane with every feeling of confidence in their permanency. In the older institutions of this kind patients can be found who have outlived every officer and manager connected with the institution at the time of their admission and every member of their immediate family—men and women who for fifty years and more have known no other home, and for many years no near family ties, whose friends have come to the close of life happy in the consciousness that their afflicted ones were secure in a home not liable to be broken up or changed.

Until within a few years proprietary asylums, so common in Great Britain, were comparatively rare in the United States. There are at present several of these in the older States. They are commonly situated near the larger cities, and draw their patients from the wealthier classes, who are able to pay for the special accommodations and greater seclusion which they offer. These institutions are usually conducted by medical men who have had special training in the care of the insane—are commonly restricted to the more quiet classes, though a few receive all classes of cases and limit the number of patients received.

They afford a home-like resort, being, as a rule, dwelling-houses which have been remodelled to suit the purposes of a small asylum, and, for recoverable cases, of probable short duration, not actively violent, are excellent places for treatment.

## Commitment to Asylums.

**Steps Necessary to Commitment and Confinement.**—The jealousy with which the "liberty of the subject" is guarded in Great Britain has led to the enactment of very stringent measures governing the commitment and detention of those alleged to be insane, and in the United States the laws passed by many of the States have been based upon the English lunacy laws.

Insanity, unfortunately, takes from the individual the liberty of action, and in the majority of instances so perverts his judgment that he resists and resents all attempts to place him where his actions can be controlled and the most favorable circumstances taken advantage of to promote his recovery.

*Voluntary Commitment.*—For the foregoing reasons voluntary commitments to hospitals for the insane are not common, though most desirable as far as the patient is concerned, because he participates actively in the means put forth to his recovery, rather than, as in compulsory commitments, giving a sullen and unwilling assent to what he cannot prevent, or, what is too often the case, violently resenting the interference with his liberty. It is evident that in the great majority of instances voluntary commitments will only take place in the earlier, and hence more recoverable, stages of the disease, and that the time may come in many such cases when from the progress of the disease the patient is no longer in a state to give assent to his further detention. In those States where voluntary commitments are permitted the law provides for such emergencies, both for the protection of the individual and of the institution or hospital having him in charge.

*Compulsory Commitment.*—In the majority of cases of insanity the commitment to an institution for the insane and subsequent detention must be against the patient's will, and hence compulsory. Voluntary commitments are desirable when the patient sees, or can be made to see, that mental and physical rest is necessary, and such regular and carefully conducted treatment as cannot be secured at home. Failing this, the patient's neglect of treatment, the pursuit of such a course of life as tends to aggravate his malady, the presence of homicidal or suicidal tendencies, neglect of lay or medical advice and control, and the common inability of families to treat and control such cases at home, make compulsory commitment and detention in an asylum necessary.

*Legal Procedure.*—To secure this certain legal steps are required. In some States these are very simple, comprising a mere statement in

the form of a certificate from one or two physicians setting forth that the person for whom detention is sought is insane, and, in the case of a patient at public support, an order from some county, municipal, or other authority making the necessary provision for support. In cases admitted at private expense some, more or less formal, arrangement is made with the family or friends of the patient.

In other States—for example, Illinois—the formality of a jury trial is required, the patient must appear, and is formally "charged" with being insane, as if sickness were criminal, and testimony is adduced to support the charge. Should the patient have sufficient intelligence to do so, he may employ counsel, and a legal fight over the care and custody of a sick man is the consequence.

In New York State and in many others a certain duration of practice, from three to five years, is necessary before a physician can certify as to the insanity of a patient for purposes of commitment. The legal form of certificate in New York is very elaborate, and is modelled somewhat after the English form. The physician must state why he regards the patient insane, must specify his acts, language, and delusions if any, and distinguish between what is observed by himself and what is told him by others. The certificate, after being sworn to, must receive the approval of a judge, who may call for more evidence or may have the patient brought before him if in his opinion such a step is necessary.

While such complicated machinery of the law may be looked upon by some as a safeguard against improper commitments, the facts, borne out by ample experience both in America and in England, are that very few improper commitments are made, and practically none for ulterior motives.

Annually, there are discharged from asylums and hospitals for the insane several patients "not insane," but these cases do not support the oft-repeated statement that large numbers are committed to such institutions for family, money, or other interested reasons who should not be there. These cases but illustrate the fallibility of human judgment, and are instances of hysteria, delirium, and sometimes "habit" cases, honestly regarded by the certifiers as insane, all of them having given when examined *prima facie* evidences of disturbed mental action. Many of the errors of judgment on the part of certifiers are made under laws of the most exacting character, and not a few of the cases thus discharged have been committed as insane by courts after verdict by jury.

By far greater risk is incurred of delaying the prompt commitment of acute cases of insanity, and thus jeopardizing their recovery, through the vexatious and complicated requirements of too stringent laws than of possible improper commitments under more lax measures.

**Importance of Early Confinement and Treatment.**—The ideal lunacy law would be one which would encourage and promote easy commitments, secure intelligent and frequent supervisory inspection of hospitals and asylums by officials interested more in the intelligent and scientific care of the insane than in routinism and the preparation of dry statistical details made to conform to their particular standard, and assure means of appeal on the part of any patient considering himself unjustly detained, with the certainty of prompt and discriminating attention and judgment.

Sir James Cox, one of the Commissioners in Lunacy for Scotland, long ago said that the asylum of Scotland which presented the best statistics of recovery and the shortest average detention of the patients was in a district where commitments were easily made without too great formality of law.

Insanity is essentially a chronic disease. In the majority of cases no hard-and-fast line can be drawn showing the exact duration of the disease. Many cases put down as recent are really of the chronic class from the outset, the degenerative and hereditary types of slow development, without, in numerous instances, any marked exciting physical cause in the way of ill-health, overwork, etc. The physician in judging of these cases finds himself depending for data upon the untrained and unreliable judgment and observation of friends and relatives, who not infrequently conceal and deny the family neurotic taint and misstate other important and material points.

Notwithstanding the difficulty of collecting accurate statistical information, the common experience of physicians dealing with these cases points to the prime importance of early, systematic treatment. Enough perhaps has already been said on this point, but I cannot too forcibly impress it upon physicians that the golden moments for recovery are in the first few months in the history of the case.

At the New York State Hospital at Utica, of 4071 cases, but 11.19 per cent. recovered of those over a year's duration on admission, while 43.56 per cent. recovered of those of six months' duration and under. Eighty-one per cent. of all the recoveries were drawn from 53.69 per cent. of the admissions—viz. those of a year's duration and under when admitted. Numerous opinions of men of large experience could be cited on this point, and page after page of statistical material, but the common experience of physicians in general practice will confirm what I have said as to insanity.

## Hospital Routine and Construction.

Having, by the necessary legal steps, been committed to a hospital for the insane, the patient enters at once upon the routine of the institution.

In some large hospitals it is the practice to set aside a ward for each sex as the receiving ward.[1] Here the most judicious and experienced attendants are on duty, and the new patient is carefully observed, and after a few days or a few weeks drawn off to some division of the hospital adapted to the peculiar features of the case.

On admission the medical superintendent or some other medical officer should make a careful examination of the papers accompanying the case to ascertain their legality and correctness. A careful examination of the patient should follow as a matter of course, the physical and mental symptoms being carefully observed and recorded. The state of all the organs should be ascertained, either on admission or as soon as possible thereafter. The history of the patient, as narrated by the person who accompanies him or by the friends, should be fully taken, and the patient's own statement at once if he is able to make one.

Many patients come to hospitals with a history of turbulence and violence at home, which, unless the medical officer admitting the case is on his guard, would induce him to put the patient in a ward devoted to excited patients at once. The moral effect of commitment to a hospital is often shown in these cases. For the first time perhaps in his career the patient finds that he is under control of others. Three or four men, possibly, have forcibly taken him from home and compelled him to go to the hospital. The shock in a measure arouses his self-control, and in many cases the first exercise of self-control is the first step in recovery. In such cases the benefits of a receiving ward are manifest. Kind, firm, quiet treatment, a little special attention for a few days, the services of one or two attendants to accompany the patient about the grounds of the hospital or in walks into the surrounding country, combined with medical treatment adapted to the peculiar features of the case, will often terminate in the transfer of the case, not to the excited, but to a more quiet, division, with gradual enlargement of liberty and a happy convalescence. The patient would probably recover if relegated to the companionship of patients, like himself, noisy and excited, but at the expense of a prolonged attack of mania. The course which I have enumerated will not, unfortunately, always prevent such an attack, but much can often be done in the very early stages after admission which can only be worked out with time and patience and anxiety later in the case.

[1] The term "ward" is not used with the same significance as in general hospitals. In hospitals for the insane it is usually applied to a corridor having rooms on one or both sides, used as bed-rooms for patients. Commonly a large parlor or day-room is attached, and bath, lavatories, and closets. In many hospitals each division has its own dining-room, though in public institutions large associate dining-rooms are coming into favor. There are also connected with some of the wards or divisions, besides the single sleeping-rooms, associate dormitories, where the suicidal, epileptic, and other special cases are collected for convenient night supervision.

The patient who at home feels that he can lay aside restraint and do as he pleases, in an institution, among strangers, puts on "company manners" and restrains his excitability. If he is encouraged to keep up this self-control, and at the same time is kept free from undue excitement, is put on liberal diet, obtains sufficient sleep, and, if physically able, plenty of exercise in the open air in the company of one or more judicious attendants, the attack may be not infrequently cut short.

The same exercise of self-control is observed in melancholy patients, but not as frequently. They apparently drop their delusions and fears, appear calm, and act in a natural manner. Such cases, though occasionally they continue to do well, should be watched very carefully: the cheerfulness and calmness are often assumed to avert suspicion, and when larger liberty is gained the premeditated suicide is attempted.

Reference has already been made to the great preponderance in larger hospitals of chronic cases. That the few acute cases might receive the attention which they demanded, and which, it was feared, was diverted from them by the necessary attention to the chronic cases, the suggestion has been made to provide separate hospitals for them, the chronic patients being transferred, as they accumulated, to large institutions for that class. A better plan would be to construct, in connection with the hospitals now in existence, small, well-equipped hospitals for the acute cases, and in these annexes concentrate and accentuate the medical work of the institution.

A mixed asylum can probably be more economically administered than one for acute cases alone. The workers on the farm, in the garden, and the shops are largely of the chronic class, and they can be availed of to assist in various operations of this kind, thus reducing to some extent the cost of support.

The disadvantages of large numbers, the depressing effect upon convalescent patients of the sight of so much that is hopeless, are somewhat over-estimated. A little care in classification, the removal from sight and hearing as far as possible of the noisy chronics, a judicious mixture of quiet, industrious chronic cases with acute cases for whom occupation is considered advisable, will more than counterbalance these assumed disadvantages.

The practice, which appears to be a growing one, of constructing in connection with large hospitals smaller buildings built more like an ordinary dwelling, meets many of the objections to mixed asylums, and affords an answer to the objections against large hospitals because of their "institutional" character. Some of the larger incorporated hospitals and a few State institutions have even established "annexes" at the seashore or in the country at convenient points, and are already reporting very gratifying results from their use.

In the matter of construction modern hospitals are happily, in many instances, departing from the older architectural styles with the long corridor and rooms on either side. The older institutions were modelled after the first asylums, which were in some instances the houses of religious orders seized and converted into asylums. The cloister- and cell-like arrangement of these earlier institutions is thus accounted for.

The construction of infirmaries for the feeble and paralytic, with well-lighted, large day-rooms, open fires, verandahs for exercise in the open air for those unable to take more extensive excursions, and the separation of the day-rooms from the night accommodations, is another advance which should be followed by all large hospitals.

## Hospital Treatment.

**General Management and Discipline.**—Aside from the use of drugs, which in the majority of cases forms the smallest part of hospital treatment of the insane, the medical administration of a hospital of this character comprises everything that in any way affects the health, welfare, comfort, or happiness of the patients.

The chief medical officer should, under the guidance and control of the board of management, which have to do with financial questions and questions of hospital or public policy, have supreme authority. He must avail himself of all the resources of the establishment, and must therefore be able to command them. A well-equipped hospital has many and elaborate appurtenances which can be best administered by one man. He need not necessarily interfere in the matter of farming nor insist upon personally directing the purchases, but he must, to be successful, be able to say that the farm is subordinate to the hospital —that it must be so managed as to give occupation to the patients when desirable; and as to the purchases, he should have full authority to dictate as to the quality and quantity, especially in the matter of food. So also with the sanitary arrangements of the hospital. If he is a well-trained physician, he should direct and control the important departments of water-supply, sewerage and sewage-disposal, heating, and ventilation.

In the matter of subordinate employés, the medical staff must of necessity be selected by the superintendent, as in that way alone can the members always be made to feel that their duty lies in thorough loyalty to their medical chief. The attendants and nurses, if made responsible to any other head than the medical, become untrustworthy and insubordinate, and the patients suffer in consequence.

All these details seem to impose an enormous burden upon the medical superintendent, but in a well-organized hospital, with efficient

subordinate heads of departments, they are but little felt, and help rather than interfere with the purely medical administration.

The established regimen and discipline of a hospital organized on the basis above enumerated are felt for good by the patient as soon as he comes under their influence. They tend to establish habit and automatism and the annihilation of self. He sees everything about him moving with system and regularity, obedient to one will, subservient to established laws and rules. He finds it more comfortable to fall into line and follow, rather than move in the erratic paths which fancy dictates, and gradually his delusions and impulses lose control and sane ideas gain the ascendency.

Important and fortunate as this tendency is in the earlier stage of the disease, it is equally important, as convalescence begins, to encourage the patient again to direct his own movements in a measure, and to cease leaning upon others. During this period gradually the liberty of the patient may be increased, until he finally feels that he is under no restraints whatever except those which his own returning good sense impose.

**Occupation.**—The question of occupation is, with physicians connected with hospitals for the insane, an ever-present one. With some it becomes a minor and subordinate element in hospital-life; with others it seems to be the predominating idea. Between these the golden mean is situated. Occupation is undoubtedly of very great importance in the treatment of the insane, but the idea of occupation which is satisfied by putting a row of twenty dements to picking hair or making fibre mats is as far short of the true aim of occupation as is the attempt to get labor out of cases of acute mania or melancholia already subject to exhaustive tissue change and waste—a misconception of its true value.

An eminent Scotch medical superintendent once told me that he had at one time declined to take a certain patient, a lawyer, who had become insane from overwork until he had impressed upon the friends the point that if he saw fit he should set his patient to digging ditches and wheeling dirt with a barrow. Possibly in the case in question the time came when it was best for the patient to do these things, but not until the physical tone had been in a measure renewed—not until a balance had been approached between waste and repair. These accomplished, it is evident that for the too-active mind of the distraught barrister some occupation that almost absolutely precluded mental activity was desirable, and certainly wheeling dirt in a barrow and digging ditches do not demand active mental work.

The benefits of occupation are manifold. Primarily, even the most simple and routine tasks keep the mind occupied, awaken new trains of thought and interest, and divert the patient from the delusions or

hallucinations which harass and annoy him. Moreover, nearly all occupations, especially those of an out-door character, call for physical exertion, which patients in certain stages of insanity cannot be induced to put forth in any other way.

For the tired, overworked farmer or farm-laborer, who for years has been at the dull treadmill of daily toil, agricultural labor would not be indicated. Rather give to him tasks which awaken new ideas and open new fields for thought. On the contrary, the dwellers in towns —the clerk, the merchant, the lawyer—are to be encouraged to engage in farming and gardening, the care of flowers, the improvement of the hospital lawn. Men with trades are too few in most asylums to permit the introduction of many industrial occupations in which they could be interested, but printing, light carpentering, wood-carving, etc. can with advantage be used as adjuvants of treatment. It should not, however, be lost sight of that these last are all in-door occupations, and that the trades of the patients engaged in them have possibly some disagreeable associations connected with their mental disturbance, and recreation and diversion should be ensured to those so occupied.

Cases of acute mania and of early paresis, if permitted, will often overwork because of too great ambition or some extravagant delusion of power or peculiar ability. Patients with melancholia will also, from a too sensitive conscience or a belief that they must earn their support, which they think is costing a fabulous sum, need watching lest they do themselves harm from overwork.

Occupation, aside from its remedial value, has a value in the general disciplinary conduct of a hospital, as it affords a channel into which the excessive activity and nervous energy of many restless chronic cases may be safely diverted.

**Recreation.**—Recreation in the treatment of insanity, as elsewhere, is to be distinguished from mere amusement. It should be something into which the patient can himself enter, which awakes his mental and physical activities, one or both, and which at the same time does not unduly excite or fatigue. For out-of-door recreation tennis, croquet, baseball, cricket, and similar games may be followed. Patients who for any reason cannot engage actively in these may be made passive participants in various ways, as umpires, score-keepers, etc. A tournament or a series of sports with a well-arranged programme, which may with advantage be announced for days in advance, and thus afford an interesting topic of discussion and arouse mental activity in healthy directions, can with great profit be introduced on occasions during the summer season.

For in-door recreation the task becomes more difficult, and commonly narrows itself down to the ordinary round games. The spelling-

matches so popular in the country a few years since would seem to suggest at least one variation from the common routine.

**Physical Culture.**—The age is eminently one of physical culture, and fortunately the prevailing fashion has taken root in many of our asylums and hospitals for the insane. Aside from occupation—and possibly on a line with it—nothing could be of greater value than well-conducted, judiciously directed physical exercise. It has its physical, mental, and, according to the experiences at the Elmira Reformatory, its moral[1] influence for good.

No one who has seen the interest which can be aroused, in cases of chronic dementia even, by patient physical training, the use of dumb-bells, Indian clubs, and the wands, can doubt the value which may be derived from the same source in cases of melancholia and in the mental and physical inactivity, with deficient capillary circulation, and the prevalent tendency to obesity, marking a period which may thence tend to convalescence or dementia.

It has been remarked that many cases of melancholia and certain of so-called stuporous insanity, or insanity of the confusional type, are shallow breathers. They do not sufficiently oxygenate the blood. For these the dumb-bells, the clubs, or better still, in some cases, the chest-weights, set up deeper respiratory movements, improve the circulation, and aid in the elimination of waste and poisonous products which are active or concomitant causes of the mental disturbance.

Military drill of a modified type comes naturally under this head, and will be found of even more extensive applicability than gymnastic exercise, as patients who cannot be trusted in the gymnasium or who are difficult to control can be induced to go through the manual with a very fair degree of regularity. The drill not only acts as a form of exercise and a mental recreation, but it has its advantage in a disciplinary way if the drill-master is one who understands his work and his patients.

**Amusements.**—Amusements should not be lost sight of in the enumeration of the remedial measures to be brought into play in caring for the insane. The sane mind enjoys laying aside the cares and perplexities of the hour and being simply amused. In the theatre or opera the outside world is forgotten; the mimic scene becomes real and supplants all else. Many institutions have distinct buildings devoted to purposes of amusement. Theatrical performances, concerts, negro minstrels, lectures, views shown by the stereopticon, constitute some of the means which may be brought into use. These are of undoubted value, and may with benefit be enjoyed by all classes of patients.

**Baths, Massage, etc.**—Approaching the more strictly medical

[1] "Physical Training as a Means of Mental Improvement," by H. D. Wey, M. D., Elmira, N. Y., *American Journal of Insanity*, Jan., 1891.

measures which are to be employed in the care and treatment of the insane, baths and massage may be considered as of great importance, especially the former.

The proper application and the value of hydro-therapeutic measures in the treatment of the insane have too long been neglected in institutions. The earlier hydro-therapeutic measures, the shower- and plunge- or surprise-bath, too often used as a means of punishment or coercion, have happily gone out of use, at least after the methods formerly employed.

De Boismont long ago called attention to the value of prolonged baths in the excited stages of mania and melancholia, and a few desultory attempts have been made—most of them without system—to utilize the Turkish bath in hospitals for the insane. Recently,[1] Dr. Robert Baker of the York Retreat has given the results of ten years' experience in the use of the Turkish bath in the institution for the insane of which he is superintendent. Dr. Jul. Morel, physician-in-chief of the Hospital Guislain, has also published a valuable contribution on hydro-therapy in mental maladies.[2]

When the patient has sufficient vigor the prolonged bath or the cold pack has undoubtedly sedative influences of great value. The very depressing, and indeed prostrating, effects of these measures renders it imperative that they should be employed solely under medical supervision.

In certain cases of insomnia, as I have elsewhere pointed out,[3] a warm bath, brisk friction, or massage, with the administration of hot beef-tea, hot gruel, or milk, will often prove of greater value than any of the hypnotic drugs. The same sedative and calming effect will be found to be of value in acute maniacal attacks and in the frenzied periods of melancholia, and occasionally in general paresis. In the latter condition the prolonged tepid or warm bath should be used with extreme caution. The patient must be carefully watched, no matter what his condition, during the bath, and on the first indication of flagging pulse, paleness, or faintness the bath must be discontinued. It is not to be inferred that the bath is to be continued until these effects are produced: the duration must depend upon the personal judgment of the physician and the effect desired.

Dr. Baker, in the article previously referred to, speaks of the Turkish bath as a curative and as a palliative agent. As a curative agent he finds it of use in the various forms of alcoholic insanity; in those cases of partial mental failure seen in men of middle or advanced life, usually of a gouty tendency; in melancholia with dry skin, disturbed

[1] *Journal of Mental Science*, July, 1889.

[2] *Bullétin de la Soc. de Méd. mentale de Belgique*, Dec., 1889.

[3] "Some Clinical Experiences with Insomnia," *The Practitioner*, Jan., 1889.

hepatic functions, and impaired digestive power; and in puerperal insanity. As a palliative he finds it of value in soothing the irritability of epileptics, in calming the early excitement of general paralysis when carefully employed, and in the treatment of chronic insanity.

Not only is the Turkish bath of direct medical value, but it has its hygienic value in the increased cleanliness which it ensures—in the freedom from the unpleasant exhalations from the skin, so common in chronic dementia, which it produces.

A well-equipped bath-house, with arrangements for shower-, needle-, spray-, and plunge-baths, with a suitable swimming-pool, would be a valuable addition to the therapeutic armamentarium of any hospital for the insane.

Massage and the Swedish movement-cure are of undoubted use in suitable cases. Disappointment has been expressed by some who hoped to find in massage a sovereign application, but in cases of insanity of the exhausted or neurasthenic type with deficient eliminative powers, poor circulation, and a tendency to constipation—a common evil among the insane—massage will be found to have a useful field of application.

The Swedish movements are applicable to the insane, but the benefit to be derived therefrom is doubtless to be found also in general gymnastic training. Swedish movements have the advantage that they can be used with some cases, especially women, who would not follow a regular gymnastic course.

**Diet and Forced Feeding.**—Insanity is, in very many instances, a condition accompanied by great physical exhaustion and by rapid tissue change and waste. Unfortunately, we understand too little of the nature of these changes, and are too ignorant of the precise relation and value of various aliments, to be able to prescribe a diet which shall be always suitable, or even applicable, to the varying cases that are presented for treatment at a hospital. The prime indication in many cases is to prepare the digestive tract to receive and digest the food which is prescribed. Constipation must be overcome, gastro-intestinal derangements corrected, various forms of dyspepsia or indigestion relieved, before much can be expected from food or medicine. The exercise, recreation, baths, etc. above referred to are here applicable and often of value. In many instances the mental disturbance is merely a symptom of exhausted vitality from insufficient food, complicated possibly by auto-intoxication. Often, cases are presented for treatment which, if the physician is not on his guard, will slip through his hands and die from pure exhaustion. For these, light, easily-assimilated food in small quantities and often repeated is indicated. In this way the amount of milk, animal broth, and predigested food which can be administered is remarkable.

The special dietetic indications arising in different cases do not

differ from those met in similar conditions among patients who are not insane. In acute delirious mania, in melancholia with frenzy, and in some of the maniacal seizures incident to the aged the great importance of a liberal, persistent use of milk, eggs, animal broths, cannot be over-estimated.

Some patients from delusion, from fear of poison, from suicidal ideas, or for other reasons refuse food. In many, time, patience, and tact will often overcome the aversion to food, but too much time must not be lost, for occasionally these cases have abstained from eating for much longer periods than their friends are aware, or have deceived them as to the quantity of food taken. Sometimes these patients will take food, if permitted to do so, by stealth; sometimes their aversion is to certain articles only or to articles cooked in a certain way. If, however, no inducement will persuade the patient to take food, resort must be had to artificial alimentation. Unless there are positive contraindications in the condition of that organ, stomach-feeding should be employed.

It is usually an easy matter to introduce a sufficient amount of food into the stomach. The nasal tube, made like an ordinary gum-elastic catheter, except that the fenestrum is replaced by a hole in the end, attached to a Davidson syringe from which the valves have been removed—or, better, to a syringe the bulb and tube of which are of one piece of rubber—forms a very convenient means of feeding. The tube, being carefully oiled, is filled with the liquid food to be used, grasped between the thumb and finger, and slowly passed along the floor of the nostril until the posterior wall of the pharynx is reached. Passing the tube slowly down, if the pressure is slightly relieved where it is grasped by the thumb and finger, a few drops of liquid will flow out and cause an instinctive act of swallowing, which may be taken advantage of to pass the tube down the œsophagus. The bulb of the syringe, which has already been filled in filling the nasal tube, may now be compressed, and if the vessel holding the food is raised the whole apparatus acts like a siphon and the food is passed into the stomach.

Some preference is expressed by physicians for the stomach-tube—the pump is never necessary—but in case of a struggle it is more difficult to introduce and much more liable to cause damage.

In case the stomach-tube is used, an ordinary tin or glass funnel placed in its open end, into which liquid food may be poured, will suffice. In removing the tube it should be tightly grasped, or, if a stomach-tube, the finger placed over the end, in order to prevent the food retained in the tube from passing into the trachea.

Accidents have happened in feeding in this way: the tube has been passed into the trachea and the tissues of the pharynx and larynx have

been lacerated; but such occurrences could only be the result of undue violence and great carelessness.

The foods which may be administered in this way are necessarily limited, but a wider range is permitted than would at first glance be suggested. Milk, the animal broths, raw or very soft-boiled eggs, gruels of various kinds, potatoes rubbed up in milk, the beef and mutton powders, may all be made to pass through a No. 8 catheter used as a nasal tube. I have found some advantage in administering with mashed potatoes, oatmeal, etc. some malt extract of good diastatic properties. A small amount soon renders one or two potatoes sufficiently liquid, with the addition of a little milk, to pass easily through the tube; and as the food does not receive the preliminary mixture with the patient's saliva, so essential to the proper digestion of starchy foods, the malt supplies in a measure the deficiency.

The various peptonized foods are in some measure available for artificial feeding.

Nutrient enemata must in some cases be resorted to, but among the insane are unsatisfactory. I have in a few cases found some benefit, as far as improved nutrition was concerned, from the use of defibrinated blood *per rectum* when desiring to give the stomach complete rest.

Among the insane, as with diet for the sick elsewhere, the food should be carefully prepared and presented in a tempting shape. The appetite must be coaxed in many ways, and every effort should be made to prevent slovenly or careless service. The house dietary of the hospital must be liberal and varied. An abundant supply of milk, eggs, and fresh vegetables should always be available. For epileptics and patients subject to convulsive seizures meat should be sparingly used.

Many of the insane bolt their food, and to these it should be given in a finely-divided state. The same should be done in all cases of advanced paresis and other paralytic affections involving the throat muscles. It is by no means uncommon where this precaution is neglected to hear of a paretic being suffocated by a large mass of meat lodging in the pharynx.

## Special Features of Hospital Care.

Aside from the general routine of hospital care of the insane there are some special features which are demanded by a certain proportion of the cases. The suicidal, the homicidal, the paralytic, and the epileptic each demands special care appropriate to the peculiar circumstances of the case. All cases of mental depression may be suspected of having thought of suicide, and to the majority of melancholics it has presented itself as an easy and ready means of throwing off the burden which oppresses them. The most careful watching cannot be expected always to prevent suicides in hospitals for the insane, but those institu-

tions which provide for the best special night-and-day observation of these cases are most free from accidents of this character.

The early morning hours are, with many melancholics, the most distressing. They awaken from a sound sleep unrefreshed, and indeed positively more fatigued than on retiring: and these are often the moments when suicide is attempted. Many patients have taken advantage of the hour of changing the night for the day attendants to accomplish the act.

This peculiar condition of "morning-tire," as Cowles[1] has called it, is familiar in other states of nervous disease, particularly those of a neurasthenic type, and deserves attention because of its practical bearing on the care of the insane, as well as of its indication in the line of medical treatment.

In large public asylums the suicidal cases are as far as possible grouped together for night supervision, usually occupying associate dormitories resembling the wards of a general hospital, thus being arranged for convenient constant supervision. Suicidal patients also attempt self-mutilation. They obey the scriptural injunction and pluck out the offending eye or cut off the offending hand. These cases demand the most vigilant care, as an apparently inoffensive pin or harmless bit of glass or crockery may do irreparable harm.

The homicidal cases are fortunately not so common, but they are to be found in all institutions. The cases just described are not infrequently homicidal as well as suicidal. These are they who destroy their families to remove them from imaginary impending disgrace, punishment, or want. These cases will also at times, so great is their desire to die, but so strong their prejudice against suicide, commit homicide, that they may be punished therefor by execution.

The more actively homicidal cases belong to the class having what the French term the delirium of persecution—patients who believe themselves subject to electrical currents, occult influences, etc., and who seek to take vengeance on their tormentors and rid themselves of torment.

Patients with hallucinations, especially auditory, not infrequently assault those about them, from whom they think opprobrious and insulting epithets proceed. Such cases demand special care suited to the features of each individual. Change of associates in a ward, change of occupation, removal from suggestive surroundings, will often prove sufficient. The occupation of such patients should be regulated with regard to this feature. I have known a homicidal patient to be perfectly freely trusted with agricultural implements of all kinds for whom a butcher's cleaver would be a dangerous implement, because he believed he must behead some one with a cleaver.

[1] "The Mechanism of Insanity," *American Journal of Insanity*, Oct., 1891.

Epileptics in the curious state known as double consciousness, following a seizure, will sometimes make violent and dangerous assaults of which they subsequently have no recollection.

Homicidal patients should always be given separate and single sleeping apartments when possible, unless the suicidal propensity also exists, and then the physician must decide which seems the greater risk and act accordingly.

The care of paralytics will be suggested by the peculiar circumstances of the case. As has been already pointed out, some modern improvements in hospital construction, the erection of infirmary wards where these cases can have special care, with opportunities for modified out-of-door exercise on broad and sheltered verandahs, have been made, which suggest an element in the care of these patients worth trying.

As a matter of principle, it is well to insist that bed-sores in such cases are never necessary, and it is remarkable how seldom they occur if care is exercised ; but in advanced general paresis, for instance, it is sometimes impossible to prevent the occurrence of acute sloughs over the sacrum and trochanters. I have seen these sloughs occur when little or no pressure existed—on the anterior aspect of the thigh and upon the dorsum of the foot. These sloughs are analogous to the instances of Reynaud's disease sometimes observed in the insane.

The care of wet and filthy cases will tax the resources of the asylum physician, but until he tries he can never appreciate how much can be done by proper night care of such cases. Patience and a persistent trial of the plan of taking such patients up once or twice during the night and placing them on the commode will often change their habits in time to a remarkable extent. Frequently the soiling or wetting of the bed occurs regularly at a certain time of night ; in such cases, the hour being ascertained, the patient should be taken up shortly before the expected period.

Paretics are subject to convulsive seizures, and they as well as epileptics should be under such close night observation as will prevent their turning on their faces in a convulsion unobserved, and being smothered by the pillow. In some institutions these patients are provided with a hair pillow or some similar arrangement, which does not exclude the air from the face buried in it as thoroughly as does a feather pillow. The only true safeguard is the presence of a night attendant.

Among the special features of hospital care should be mentioned the influence of the institution. The effect of cheerful surroundings, of decorated walls, light rooms, a pleasant outlook, flowers, books, pictures—in short, what may be termed the æsthetics of the patients' environment—are all for good. I have seen the entire character of a ward change, so far as the conduct of the patients was concerned,

by the addition of a large sitting-room, the frescoing of the walls, and the introduction of homelike furniture, pictures, and books.

As Connolly has said, "Some unmanageable tempers, some violent or sullen patients, there must always be," and for such there must be provision made. Seclusion, the separation of a patient wholly from his fellows, too often means neglect. If the nurse feels that all that is necessary is to put a patient in a room and turn the key, such a resource will be often called into requisition. It is necessary often, and sometimes best, to seclude a patient temporarily, but continued seclusion is bad for the patient, and, unless the physician is on his guard, demoralizing to the ward discipline. When seclusion is necessary for a very violent patient in a condition of frenzy, a padded room is a very convenient and safe arrangement. Such rooms generally have their walls and floors padded with canvas-covered mattresses. In England and Scotland they are more commonly used than in the United States.

If the patient is not too violent, and is not inclined to make assaults on the attendants, it will generally be found that a little care and tact will enable him to have considerable liberty under the observation and in the presence of two or three attendants in a quarter of the hospital where he will not disturb others nor be disturbed by them.

The vexed question of mechanical restraint is a difficult one to treat in this connection. The almost total abolition of mechanical restraint is one of the achievements of modern hospital work, and a very gratifying one. Some medical superintendents, indeed, have gone to the extent of adopting, as a rule of practice, "Absolutely no mechanical restraint." I think the more conservative will agree with me that restraint is sometimes necessary and humane. The other resorts are seclusion or manual restraint, which entails a struggle with one or more attendants.

One other resort I have not named, because it is only employed by the indifferent or those who have no resources within themselves, and cannot plan any other course of action. I refer to the use of sedatives. Patients can be kept quiet, even stupid, with hyoscine, hyoscyamine, chloral, the bromides, or opium, but at what cost!

The adoption of non-restraint as a dogma was the natural reaction from the abuse of restraint of a few years ago. I have been told by a man who had served many years as an asylum attendant under the old system that with, as far as he could judge, the same class of patients as he then cared for with little or no mechanical restraint, under the old method it took him as long to put on and take off the restraining apparatus morning and night as it did to dress and undress his patients.

The sentimental plea that patients rebel against canvas and leather, and are unduly irritated and excited by the very means intended to

allay and control their violence and excitement, is undoubtedly well founded in almost all instances. On the other hand, intelligent patients have thanked me for the use of restraint apparatus rendered necessary by their frenzy or attempts at self-mutilation or destruction, remarking that they accepted the restraint of the inert canvas or leather when they would have resisted the manual restraint of nurses, no matter how kind, as an unwarrantable interference with their liberty. Another patient, for whom restraint was on one or two occasions necessary, said she had a horror and aversion indescribable of being held by any one, but would submit quietly to being controlled by a camisole.

Attendants should never be permitted to apply restraining apparatus: it should be as much a medical prescription as any preparation of the Pharmacopœia. They should be encouraged to believe that it is seldom necessary, and then only as a temporary expedient to be put aside as soon as possible. I once heard a medical superintendent epitomize the whole matter in one sentence in reply to the request of an attendant to be permitted to restrain a particularly violent patient: "I prefer you to use your brains, and you should place your ability on a higher plane than leather." Fortunately, restraint apparatus can be commonly made very simple and but little irksome, and usually tact and judgment will obviate its use.

To prevent self-mutilation or destruction, to retain surgical dressings, to control habits of self-abuse, restraint may sometimes be necessary. There are some occasions when it may be better to use it than to resort to other means, but its use should always be temporary and always under medical prescription. This last phrase covers the whole subject of the hospital care of the insane.

The care should always be under medical direction, and the medical director should always be ready to avail himself of all the therapeutic agents, whether elements of the materia medica or what have been termed moral agents, in the treatment of his patients. He should have a hospital suited to the demands of the day, cheerful, home-like. Recreation, occupation, amusement, baths, exercise,—all enter into the daily routine of hospital work, but none should be used in mere routine; each should be adapted as far as possible to the case in hand.

# THE MEDICAL TREATMENT OF INSANITY.

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The medical treatment of insanity in its wider signification includes the employment of all the means at the physician's command for the control and the cure of the disorder. It therefore includes the hospital treatment—the care and management of the insane in hospitals or asylums, where they are sequestered and restrained as well as treated medically in the narrower sense of the term. This is the more true since the hospital, from the nature of the case, is an indispensable adjunct to any treatment, properly so called, in a very large proportion of all cases of insanity, and not the least important of the agents which tend to the recovery. The seclusion, the discipline, the regular life, the change of surroundings, facilities for classification and association of patients, the means for their protection, the skilled attendance, and all the other appliances which are afforded by a well-equipped and managed hospital for the insane, are in themselves often sufficient to direct a case of insanity to a favorable termination. In these days, when so much is said in regard to the suggestive treatment of disease, the hospital for the insane may be considered one of the most decisive and effectual of suggestions.

Considering this fact, that separation from the patient's usual associations and more or less strict control by others are almost indispensable in the treatment of the majority of all cases of insanity, a more limited definition of the medical treatment has some difficulties. Since, however, the public and private care of the insane in hospitals or asylums forms the subject of a special article in this work, what is here considered will be limited to the medicinal, hygienic, dietetic, and moral measures that are available, with or without hospital treatment, and which come directly under the charge of the physician who has the medical care of the insane. Certain questions, such as those of restraint, seclusion, etc., which will be more fully considered in the article on the hospital care of the insane, can hardly be passed by altogether, but will be only briefly and incidentally treated in this article.

Insanity, looked at from a therapeutic point of view, may be considered as a symptom of disordered or defective functioning of the brain. When we take into account the relations of this organ with

the whole body and its direct and reflex connections, and its liability to be affected by derangements or diseases of all other bodily organs, the extent and complications of the subject become very manifest. We cannot confine our attention to the symptoms alone and ignore its possibly still existing and active cause; hence the necessity in every case of insanity for a thorough examination of all the bodily organs and the detection of any and all conditions that can cause or influence the disorder. The personal and family history and all the antecedents of the case are also of the highest importance, as affording valuable data that may guide to a proper treatment. We may find from such examinations that an attack of insanity is only the manifestation of a larvated malarial infection or the result of rheumatic poison in the system; it may be due to syphilis, to uterine displacement, or to disordered menstruation, or possibly to localized brain lesions; and in case of any of these there may be obvious indications for treatment. Besides such disorders as these, which directly cause the insanity, any coexisting bodily disease may materially affect its progress or prevent its cure; and the one universal general principle of the physical therapeutics of insanity is to exercise a continual watchfulness for, and to remove or favorably modify to the fullest possible extent, all existing morbid bodily conditions that can, directly or indirectly, exert any unfavorable influence. Following out this principle to its fullest extent, the therapeutics of insanity may take the widest possible range, and it would be useless to attempt to give any brief summary of the treatment of mental diseases.

Practically, however, we are compelled to treat insanity in the majority of cases as a disease by itself, and its somatic symptoms as consequences or concomitants rather than as causes of the original disorder of the brain. There is no human ailment that presents more difficulties in the way of obtaining its causes and antecedents: the patient himself is liable to be disqualified for a reliable witness by his disorder, and there are numerous and obvious reasons why the testimonies of friends and relatives may be defective or untrustworthy. In addition to honest ignorance, which is not exceptional, we have family pride, the desire to avoid disagreeable conclusions as to heredity, possibly also the not unnatural wilful suppression of important facts bearing on the case, all tending to render it the more obscure and to embarrass the physician. It is possible that the real pathological etiology of one form of insanity is still in question, largely on account of these suppressions and misrepresentations. This is one cause of embarrassment in determining the proper treatment, and another difficulty is to be found in the fact that mental disorders themselves obscure bodily symptoms, and the rational and even the physical signs of disease are apt to be modified or occasionally sup-

pressed in the insane. This is true not only in conditions of advanced insanity, but it may also be the case, to a certain extent, before the mental disorder has fairly manifested itself. The insane belong very largely to the class of neurotic and physically degenerate individuals, in whom the rational symptoms of disease do not always regularly make their appearance even in advanced stages of serious disorders. In persons of this type, aside from the predisposition due to the neurotic or defective organization, there may have been some masked ailment acting as an exciting cause, or some slight morbid condition, that would have been easily recognized and remedied in a normally constituted individual, may have passed unnoticed until it had thrown the already unstable brain into active disorder. This probably occurs more frequently than is generally supposed, for there is certainly a very large number of the insane in whom, beyond a possible neurotic heredity, there are no plainly recognizable bodily conditions to account for the mental disorder. The rôle that heredity or predisposition plays in the production of insanity is hardly to be over-estimated, and it is often found useless to search for causes that may have been themselves of very temporary nature, and yet sufficient to turn the balance between insanity and mental health.

Whether or not reliable data can be obtained from the history or examination, there are in all well-marked cases of acute insanity certain prominent indications for treatment. The beginnings of mental disorder do not, as a rule, come under the observation of the physician, except when it supervenes on some existing disease that is being treated or when it is connected with the puerperal condition. Usually we have to deal with a more or less advanced stage when the disorder is readily recognized by the friends and associates and perhaps by the patient himself. In this state of affairs the first matter to be attended to is to see that he is under proper observation and control. An insane person is legally, and often morally and completely, irresponsible, and others have to assume the responsibility for him; the persons and property of others must be protected, and he must be protected especially against himself. One of the first questions to be decided is whether asylum or hospital treatment is necessary. In cases of acute mania there is usually little difficulty in deciding: the condition of the patient is such that under ordinary circumstances home treatment is impracticable. In some instances, however, owing to prejudices of friends, the objections to publicity, etc., removal to a hospital is not permitted, and in these the question resolves itself into one of expense. If it is possible to have the services of skilled attendants and to fit up suitable quarters at the patient's residence, a case of acute mania can be successfully treated at home, though there are many disadvantages to such a course. When the patient or his friends cannot afford the great

expense that proper home treatment involves, the hospital is the only resource. With melancholic patients the case is somewhat different. The severer forms of melancholia require hospital care even more than mania, as the subjects are more dangerous both to themselves and others than those afflicted with any other form of insanity. The milder depressive forms of insanity can be, and constantly are, successfully treated at home; they are probably the most frequent and most curable phases of mental disorder, and yet they do not enter nearly so largely into the statistics of our asylums as this fact might lead us to suppose. The patients of these types are frequently not restricted in their liberty; they sometimes continue in their usual avocations, and are merely the office-patients of doctors and specialists. Nevertheless, there is an element of danger in the great majority of these cases; the possibility of suicide, and even of homicide, cannot be left out of consideration. A very large proportion, possibly the majority, of the suicides, and not a few of the cases of homicide, reported in the daily press are furnished by just this class. On the other hand, to a depressed patient of a certain type the commitment to a hospital may intensify his malady, retard or prevent its cure, and thus be a positive damage rather than a benefit. The responsibility of advising in such cases is a serious one for the physician, and it is impossible to lay down any general rules that will cover all possible conditions. The most that can be said is in case of uncertainty to give the safer course the benefit of the doubt. It is for these milder cases of melancholia that a system of voluntary commitment is desirable, or, frequently, if they can afford it, a sojourn in some sanitarium, where they can be under medical care and watchfulness and have some of the advantages without what is to them the opprobrium of a hospital for the insane.

The passive forms of mental disorder (stuporous insanity, mental hebetude), when simple and not alternating with or interrupted by attacks of more active derangement, can of course be treated at home, provided they can there receive the care and personal attention they require. As regards other forms, there is seldom much difficulty in deciding, except possibly in certain peculiar types of epileptics, which will be spoken of later.

Diet.—One of the most important things to be kept in mind in the general treatment of acute insanity is that it is a wasting disorder, and that it taxes heavily the vital powers. The brain especially suffers, and the only way of meeting the expense on the system is by giving prompt and sufficient attention to the nutrition. The diet in acute insanity should be generous and ample; its details may be left to the dictates of medical common sense in each individual case. One would naturally hardly advise a too stimulating or carnivorous diet in certain phases of excitement, or, in short, the use of any articles of food contraindicated

by the physical condition of the patient. Nor, on the other hand, is it usually necessary to adopt the ideas of certain recent writers who would exclude nearly all nitrogenous aliment in these cases. Early attention to this matter is required, because with the derangement of the brain the whole system is involved, and the appetite is not the safe and natural guide that it is in health. The excited maniac does not recognize his bodily needs, and in the depressive forms there is often a positive aversion to food. If the cause of this can be found and avoided, it is the first indication for treatment; but often it is due to delusions, to suicidal intent, to a paralysis of the appetite connected with the mental disorder, or possibly to mere excitement, and in these cases active interference is required. Sometimes the patient can be induced to eat, or is passive and can be fed by hand, but in many cases forcible feeding is required, and must not be put off too long to the damage of the patient's welfare. In some instances food will be taken, but in insufficient quantity, and the patient will run down from want of nourishment, while it is reported all the time that he is eating regularly. Too close attention, therefore, cannot be given to this matter, as carelessness and too much faith in the friends' or the patient's own statements may have serious consequences. When the refusal of food is persistent in spite of the utmost tact and perseverance on the part of the attendants, artificial feeding in one form or another is required. Occasionally this can be effected by the nurse with a spoon or the feeding-cup provided with a small nozzle through which liquid food can be poured into the mouth; but more frequently in such cases, according to my own experience, the feeding-tube is necessary. This may be the large œsophageal tube, introduced through the mouth and carried down through the pharynx and œsophagus into the stomach, or the smaller nasal tube, which is carried through the nostril and then down through the natural passages. The first of these has the advantage that it cannot well be forced through the larynx, and that it is almost invariably tightly grasped by and fills the œsophagus, thus precluding any possibility of regurgitation around it, and it is therefore perhaps safer in inexperienced hands. Against this may be counted the disadvantage that in excited or resolute patients it requires the forcing open of the mouth, which is exceedingly difficult at times and necessitates an unpleasant struggle, with the risk of breaking teeth. Moreover, after it is introduced it is not perfectly secure, as the gag in the patient's mouth may slip and the tube be bitten in two. In spite of all appliances, such as instruments for opening the mouth, the use of restraining apparatus, etc., the introduction of the tube under such circumstances is apt to be a rather rough operation. Some patients have also the power to regurgitate through the œsophagal tube, which makes the feeding more difficult, and is very disagreeable to the operator unless a fountain syringe or something similar is employed. The soft-

rubber nasal tube introduced through the nostril has many advantages, and is much preferable in experienced hands. It requires no gag, no forcing open the mouth, but there are certain cautions to be observed in its use. Its small size makes it possible for it to slip between the vocal cords, and serious accidents have occurred in this way. A good precaution, if the patient will talk, is to get him to use his voice in some way after the tube is introduced and before any of the food has been passed through it. In any case there should be a certainty that the breathing is free and unembarrassed. Some patients also are apparently so constructed in the pharynx as to render the introduction of the nasal tube particularly difficult, especially if there is much resistance; but this difficulty can generally be overcome. The irritation it causes to the nasal mucous membrane is not serious, and after it has been used a few times it seems to cause very little if any discomfort. The tube should be of soft, flexible rubber, so as not to injure the parts with which it comes in contact, should be slightly lubricated before using, and should be long enough to reach to the cardiac orifice of the stomach. It should also be of the largest diameter that will permit of its introduction through the nostril. If too small it may not fill the œsophagus, and food may be regurgitated around it, and thus enter the air-passages and give rise to serious consequences. If this occurs, whatever the size of tube employed, it should be promptly withdrawn and the feeding stopped before any quantity of the liquid food can have entered the trachea. In subsequent feedings the larger oral stomach-tube should be employed, as less dangerous for such a patient in spite of its inconveniences. Accidents of this kind very rarely occur, but their possibility should be kept in mind, and the lack of sensibility in some insane patients makes them the more serious. The best method of using it is to introduce the food slowly from a fountain syringe or a funnel, though an ordinary bulb syringe will answer. It ought also to be securely attached to the nozzle of the syringe or funnel that is employed, as in case it should become detached it might easily be swallowed by the patient—an accident that has occurred. The feeding ought to be done by the physician or under his personal direction, at least the first few times, on account of the possibility of accidents. If it has to be kept up for any length of time and there are no special difficulties, it may perhaps be entrusted to a well-instructed and competent nurse, though the presence of a physician is always advisable.

It is rarely necessary to keep up artificial feeding over any considerable period of time in ordinary maniacal cases, but it is frequently required a few times in the early stages of the attack. The filling of the stomach appears to have often a very beneficial effect on the excitement, and the process of digestion acts as a general sedative.

The introduction of the stomach-tube for the first time is not an agreeable operation to the patients, and they will often voluntarily feed themselves to avoid its repetition. With determinedly suicidal melancholics, and with some others in whom the suicidal impulse is not notably strong, but who have an excessive aversion to food, it may have to be kept up for weeks or months. In one case of cyclical insanity of long period under my own observation the feeding-tube had to be employed during the whole of the stage of depression, lasting over eighteen months. Such cases, however, are very exceptional, and it seldom has to be employed for more than a few weeks at the longest, and can be dispensed with altogether in a large majority of cases. The proper time to begin forcible feeding is a matter that needs the attention of the physician, and it may easily be deferred too long. In mania gravis or acute delirium hyperalimentation is the main stay of treatment, and it can hardly be effected in every case without forcible means. In the severer cases of acute mania the patients are also liable to suffer if feeding is neglected. With those of depressive insanity without continuous agitation the necessity is less urgent at the beginning, but these are the cases that are ultimately most likely to require it, and in whom it has to be longest continued. In paranoia, where the refusal of food is due to a delusion, and in some hysterical cases, if there is no great bodily waste, there is not usually very great urgency for immediate forcible feeding, and it need not be resorted to unless every other means has been tried and the patient's condition is threatening.

The food used with the stomach-tube must necessarily be liquid, and there is nothing better, as a rule, than milk and eggs. From a pint and a half to a quart of milk, with one or two raw eggs stirred up in it, and given two, or preferably three, times a day, will suffice in ordinary cases of refusal of food to keep up the patient's strength and prevent inanition; but more frequent feeding is often advisable. It is better administered, in my judgment, with the patient lying down, especially if there is much resistance, and some sort of restraint, either manual or instrumental, is often necessary. The diet can be varied as may appear desirable, occasionally with broths, etc., and the times of feeding afford the opportunities for administering the necessary medicines, which can be added to the food.

**The Excretions.**—A second matter of great importance is to attend to the condition of the excretory functions. It is the rule in acute insanity to find a sluggish condition of the bowels, and this in many cases has preceded the attack for a period of weeks, or even months or years. This is especially the case in melancholia, though it is not at all uncommon also in acute mania. Frequently the rectum is clogged with compact masses of hardened fæces that may, in some instances, require

operative interference before a free evacuation can be obtained. More commonly, however, the constipated habit is what we have to combat, but in all cases, or nearly all, it is well to order a simple enema of soap and water in the beginning of the treatment. This will be likely to relieve the lower bowel of any such mechanical obstruction as described above, can hardly do any harm of itself, and is not generally more difficult than to administer drugs to an excited or obstinate patient. Active drastic cathartics should be avoided ; it is not advisable in any of these cases to produce a great amount of intestinal irritation or to deplete the patient by active purgation. All that is required, after the bowels have been fairly moved, is to follow up the treatment, so as to ensure their regular and natural action. This can be effected generally with the milder laxative medicines—such as some of the cascara preparations—and sometimes by the diet alone. Occasional recourse to enemata is also advisable in many cases ; they need never be irritating, and may be made to act as a tonic to the lower bowel. I have often observed excellent results from the use of injections in both mania and melancholia in relieving the excitement or depression, and in some few they seemed to be the starting-point of a rapid recovery. These were probably instances of the so-styled sympathetic insanity, depending principally upon the condition of the colon, to which Schroeder van der Kolk called special attention many years ago. In some of these cases the mere mechanical relieving of the intestine of its burden of the fæcal masses has alone seemed sufficient to produce an almost immediate cure of the mental disorder. In the vast majority, however, it is probable that the evil effects of constipation are not confined to the overloading and distension of the bowel and its reflex action on the brain ; the retention of so much waste and deleterious matter in the body, in contact with surfaces that are more or less absorbent, can hardly fail to have an injurious effect, and the products of intra-intestinal putrefaction may play a very important part in producing the morbid action on the nervous centres which results in insanity. If this be the case, it would appear not irrational to use with, or follow up the laxative treatment with, some medication to produce an antiseptic action on the intestinal tract. Small doses of naphthalin or hydronaphthol are not likely to be injurious, and are, I think, advisable, unless there should be some decided contraindication.

Schroeder van der Kolk attributed much of the trouble in his described sympathetic insanity proceeding from the colon to intestinal strictures above and in and about the sigmoid flexure. It is certain that abnormalities in this region are very common in the insane, and it is easy to see how such constrictions would favor the retention of the waste products. It does not, however, seem to me necessary to invoke the action of such lesions as a cause of the constipation in most cases,

and the prognosis is more hopeful if we can assume or presume that they do not exist in any particular case.

The majority of the patients in whom the sluggish action of the bowels is a special object of treatment are of the melancholic type, and the symptom is more frequent and more characteristic of the depressive forms of insanity than of any other. Nevertheless, it is very often met with in the most maniacally excited patients, especially in the beginning of the attack, and some of the most difficult cases are met with amongst this class. I have seen a few instances of recent insanity with exalted delusions and noisy excitement, with a certain degree of comparative motor inactivity, associated with a very generally disordered condition of the whole alimentary canal, and the most completely locked-up condition of the intestines that has ever come under my observation in any disease whatever. In some of these cases, after relieving the rectum by injections, etc., and employing all the purgative remedies that appeared safe or advisable, I have obtained the best effects from the use of calomel in minute doses—one-tenth of a grain repeated every hour till eight or ten doses have been given or a free evacuation of the bowels has taken place.

In ordinary cases of acute insanity a simple enema is often amply sufficient to relieve the unloaded bowel, and it is only rarely that anything like the above-described treatment is required. It is not necessary in all cases, even in the milder depressive forms, to insist absolutely on a regular daily evacuation of the bowels, though it is better if this occur; but every precaution must be employed to prevent the continuance of the constipated habit. In maniacal cases the matter is usually more easily managed: the disposition is not, as a rule, nearly so strong, and in many cases the bowels act very freely, and sometimes may require checking. Attention must nevertheless be given constantly to their condition, as costiveness or constipation directly aggravates the mental disorder.

More stress is here laid on this subject of the condition of the bowels in acute insanity than it receives in most textbooks or treatises on the therapeutics of mental disorders. It appears, from my personal observations, to be one of the very matters that is often neglected, or that, at least, does not always receive the attention it deserves. There is no doubt that in giving early attention to these conditions we can sometimes strike at the root of the disorder; and this fact alone is enough to render it deserving of all the importance that has been given to it here.

The urinary secretion also needs some attention, as in depressed and stuporous conditions the patient may neglect himself, and the evil consequences of retention of the urine may ensue. It is probable also that in some forms of mental disease the urine is changed in quality, and it

may fail to perform its normal function of removing toxic substances from the system, and thus aggravate the condition.

**Sleep.**—The fourth great essential in the treatment of acute mental disorder is to secure for the patient sufficient and restoring sleep. Nearly all recent cases of insanity suffer from the lack of this: it is one of the most prominent features of the disease. The insomnia of insanity is frequently of the most obstinate kind; it may have preceded the actual outbreak, or what is accepted as such, for many weeks, and in some cases have become, as it were, a habit that has taken a firm hold of the individual. In such cases it is, of course, not absolute sleeplessness, as the human system could not endure it, but the amount of sleep actually taken is unsatisfactory, and is near the minimum that the patient's powers of endurance will allow. This is more particularly the case in some of the acuter depressive types, while in active maniacal cases the loss of sleep may be more continuous over a shorter period. To remedy the condition the use of hypnotic drugs is naturally the first suggestion, and it is possible to commit the error of overdoing the medication. Any indiscriminating use of chloral or the bromides, which are the remedies most frequently resorted to, is to be deprecated. Insomnia is a symptom that may depend upon very different physical conditions: it may be caused by active cerebral congestion, or, on the other hand, it may be due to an exhausted and irritable state of the nerve-centres that is associated rather with an anæmic than with an overfilled condition of the blood-vessels. In the former case it can be often relieved by the use of a warm bath just before retiring; I have many times seen an acute maniac sleep quietly for hours with no other treatment. The bath should be fairly warm (95° F. or a little more), and need not be continued longer than twenty minutes or half an hour, and may be supplemented with cooler applications to the head. It is not usually safe, however, to depend upon this alone, and some medication is called for. Chloral hydrate has been of late years the most universally employed hypnotic, and has been given in very large doses for the insomnia of insanity. It is undoubtedly the most efficient hypnotic we possess, but its employment is not without risk. It is not invariably possible in excited, maniacal patients to be sure that there is no cardiac or respiratory complication that would render it a dangerous agent, especially in the doses that are sometimes employed. I myself have seen unexpected and undesirable effects from its use when I had reason to believe that there was no special contraindication, and the quantity taken was not excessive or more than had been repeatedly given on prior occasions to the same individual. For these reasons I have seldom administered it in doses of more than 20 grains, and then in combination most frequently with some adjuvant, preferably the bromide of sodium, either in equal amount or slightly in excess.

When the sleeplessness of mania in the active congestive stage is not remedied by fifteen or twenty grains of chloral and twenty or thirty of sodium bromide, together with the warm bath and an enema before retiring, I prefer to use some other hypnotic rather than increase the dose. There are a number that can be resorted to, and some of them are hardly inferior to chloral in their sleep-producing effects. Paraldehyde is nearly a pure hypnotic but little less effective than chloral in many cases, and has not the dangerous debilitating action on the heart possessed by the latter. Its disadvantages are—the difficulty of disguising its disagreeable taste, the gastric irritation it sometimes produces, and the necessity of increasing the dose to produce the desired effects if its administration is much prolonged. Its steady employment is also liable to cause gastric and other disturbances, but in this respect it is hardly peculiar among hypnotic drugs. Sulphonal is another valuable remedy for insomnia, which I have found very effective in many cases of mental disorder, especially in women. In men the effects of this drug appear to wear off more rapidly; a toleration of the remedy as regards its hypnotic action seems to be sooner attained. It is rather slower and more lasting in its effects than some of the other hypnotics, and is therefore perhaps less adapted to acute congestive maniacal conditions than the chloral-bromide combination; but I have seen excellent results follow the administration in acute mania of as little as 10 grains, and have never seen any serious after-effects from as much as 30 grains. It has, however, often been known to produce transient vertigo and ataxia, and in a few cases more serious symptoms of disturbance of motility and consciousness. In moderate doses (10 to 15 grains) it is a valuable hypnotic, and has the special advantage that it is almost tasteless, and can therefore be administered with the food if that is found desirable. It is not a good plan to give the larger doses (20 to 30 grains) continuously in any case. The dangers of this drug that have been pointed out of late by Breslauer and some others are due, I believe, to such a practice, and can be avoided without losing any of the real advantages to be derived from its employment in suitable cases.

The addition of 2 or 2 grains of acetanilid to the usual dose of sulphonal adds considerably to the hypnotic effectiveness of the drug, but the effect of this combination on the heart needs to be looked after in case it is employed.

Amylene hydrate and chloralamide are also highly spoken of as sleep-producers in insanity, though the latter is probably less efficient in cases of high excitement than the drugs already mentioned. Amylene hydrate appears to act very similarly to paraldehyde, but I cannot speak from personal experience with its use. The list of new hypnotics is becoming a rather long one, but the

above-mentioned are those that promise to be most serviceable in the insomnia of maniacal conditions.

In some cases of acute mania, well nourished and otherwise in good bodily condition, nature seems sometimes to reassert itself, and there is a tendency to natural restoring sleep. In these patients a very moderate amount of a hypnotic drug is occasionally unexpectedly effective. I have seen a very deep slumber from which the patient could be aroused only with difficulty, and then immediately again fell asleep, almost resembling opium-narcosis in this respect, and lasting nearly ten hours, produced by a sedative dose that seemed entirely inadequate to produce such an effect. Commonly, however, the tendency is to bring about an exhausted and anæmic condition of the brain that tends to prevent sleep through pure irritability. In this state of things moderate or slight stimulation is often the best hypnotic; an ounce or half an ounce of whiskey in a half pint of milk, a glass of wine, or, better yet in most cases, of beer, at bedtime produces the best effects. One thing must of course be kept in mind in the employment of alcoholic stimulants in this way, and this is of more importance in the home than in the asylum treatment of the insane; that is, to run no risk of arousing an appetite or forming a habit of their use.

Though not largely used, the wet pack is an excellent hypnotic in excited maniacal conditions, but more will be said later on, when the subject of hydrotherapy in insanity is discussed.

In agitated melancholia much the same measures to produce sleep are applicable as in mania, but there is in this condition another disturbing cause that often calls for special remedies. Melancholia has been called by Krafft-Ebing a psychic neuralgia, and there is in it frequently an element of actual physical pain, which is, in the peculiar condition of the mind, felt to its utmost extent. In this condition an analgesic is required as well as an hypnotic, and for many cases opium in some of its preparations by the mouth or morphine hypodermically best answers the requirements. If opium is administered internally, it is usually not best to commence with more than the ordinary therapeutic dose: from 10 to 15 drops of the deodorized tincture is enough for a beginning, and it can be combined with a bromide, or cautiously with a moderate dose, not exceeding 10 grains, of chloral. The hypodermic use of morphine is preferable to the administration of opium preparations by the mouth for several reasons. It is, in the first place, quicker and more certain in its effects; there is less apt to be disturbance of the stomach; and its administration cannot be so effectually resisted if the patient is disposed to refuse treatment, and it is more under the control of the physician—an advantage that is not to be under-estimated in the home management of the disorder. It is well in these cases to begin with not over $\frac{1}{6}$ or at most $\frac{1}{4}$ of a grain,

and carefully to watch the effects. Anything like narcotization is in the highest degree undesirable.

In some nervous and slightly hysterical cases I have observed very satisfactory hypnotic effects from a combination of the bromides—fifteen to twenty grains of the sodium or potassium salt, with a drachm of elixir of valerianate of ammonia—when other usually more effective drugs had failed. Enforced rest in bed, with thorough alimentation and care as to the condition of the bowels, is often of itself sufficient to bring about a habit of sleep in many melancholics, and is a method of treatment more applicable in this form of insanity than in most other forms. The use of stimulants also—a milk punch at bedtime or a glass of wine or beer—is also more generally useful in melancholia, where there is presumed to be anæmia and insufficient nutrition of the brain, than in most cases of active mania, but the caution as to forming or awaking a habit needs to be still more emphasized in these than in the other cases.

Whatever hypnotic is employed in acute insanity, it is always well to discontinue its use at the earliest moment when it appears that the patient can obtain sleep without it. It is also unadvisable to administer the same remedy over any considerable length of time; it will generally be found better to change or alternate the drug employed with some other. The list of hypnotic remedies is long enough to afford considerable choice, and besides those I have mentioned there are others that are more or less highly spoken of, and that may be of service in special cases. Among these I may mention urethan, which is effective in some cases; uralium, a mixture of urethan and chloral; hypnal, a similar compound of chloral and antipyrine; and others. In any case also it is generally advisable to intermit all hypnotic medication at short intervals, every few days for a night or two, if it is required to be kept up over a considerable period of time. In doing this we diminish the chance of creating a habit or of inducing a toleration of the drugs employed, and also afford ourselves an opportunity to observe how the patient can get along without them, and of avoiding a too long continuance of their use. Remedies of this class are only harmless when actually necessary; if employed longer than they are really required, they are positively deleterious to the system.

Recapitulating, the universal requirements of the treatment of all cases of acute insanity are—

1. The proper control and supervision of the patient for the protection of himself and others. This can be secured only by proper attendance, and in a large proportion of cases can be best, if not solely, secured in a hospital for the insane.

2. Proper and sufficient nourishment, by forced feeding if necessary.

3. Attention to the condition of the bowels and the excretions generally, and avoidance of any tendency to constipation.

4. Sufficient and restoring sleep. If this cannot be obtained by regimenal measures, such as warm baths, diet, etc., recourse is to be had to hypnotic drugs, which should be employed intelligently and with caution, frequently alternated and intermitted, and discontinued at the earliest moment when their employment is not absolutely necessary for the welfare of the patient.

To these four essentials in the treatment of all cases of acute or recent insanity should be added the universal general principle of the therapeutics of mental disease, which was stated in the beginning of this article—viz. to search for and discover any and every bodily disease or condition that may act as the cause of the insanity, and the treatment or removal of which may tend to its cure.

While the foregoing are the general essentials of the medical treatment of acute or curable insanity, they do not cover the details of the management of the various forms of mental disease. Nothing, moreover, as yet has been said in regard to the indications from the pathology of the disorder or of certain very important therapeutic agents and methods that require extended notice.

Taking up first the pathological conditions that may be supposed to underlie the mental disease, the principal ones—and practically almost the only ones that we have to consider in relation to medical treatment—are those connected with the blood-supply of the brain. Whatever morbid states of nerve-cells and connections exist that are not connected with or dependent upon disturbances in the circulation, are not, as a rule, directly amenable to medical treatment, or at least we do not usually attempt to act upon them with medicine otherwise than by treating the symptoms they produce. Cerebral hyperæmia, on the other hand, has undoubtedly much to do in the production of many of the symptoms of excitement, and we can attack it directly. The older methods of depletion by bleeding, etc. have deservedly gone out of fashion, though there are still rare occasions in which they may be of service. I have seen temporary good results from both bleeding and depletion by purgation in one or two plethoric epileptic maniacs, and one case of acute congestive mania completely and almost instantly relieved by the abstraction of more than twenty ounces of blood. The patient was picked up on the streets in an acutely maniacal condition, and sent to the hospital without any data as to his antecedents. It was observed, however, that he was very plethoric, and that there were numerous scars, as if from former bleedings, on his arm. He became rational almost at once after the operation, and gave some account of himself. It appeared that he was one of those individuals, rather rare in this country at the present day, who have the habit of being regularly bled, and that he

had missed his customary relief, and the maniacal attack was the result. Such cases are so exceptional, however, as not to affect the general rule that depletion by bleeding is to be condemned as a therapeutic measure in insanity. The danger of reducing the patient's strength and recuperative powers is considerable even with the milder measures of cupping and leeching, especially in cases of acute mania, in which there is always a tendency to exhaustion in the excited congestive stages, and the possible benefits do not commonly warrant the risk.

The other ancient method of active depletion by purgatives is fully as objectionable, and falls under the same condemnation. The use of warm baths with cold applications to the head, which have been already mentioned in connection with the treatment of the sleeplessness, the employment of ice-caps, occasionally also local irritation by mustard plasters, mustard foot-baths, etc., may be mentioned as methods of external treatment that may be of benefit. Local irritation by a mustard plaster over the cardiac region often has an influence in checking excessive action of the heart, and thus relieving the tension of the cerebral vessels in active congestion.

The medicinal treatment of these conditions consists mainly in the employment of the bromides, which are, considering all things, the best internal remedies at our command. Next to these, as controlling cerebral congestion, we may place ergot, which may be given either alone or in combination with the bromides. It may also be given hypodermically in the form of ergotin, and sometimes acts most effectually this way. The main dependence, however, is on the bromides, as far as drugs are concerned, in reducing cerebral congestion, but if carried too far they are apt to produce the uncomfortable symptoms of bromism. Their beneficial effects, moreover, do not continue long after their administration; they regulate the circulation for a time, but are not to be relied upon to remove the cause of the disorder. This must be done by restoring the general tone of the nervous system by tonics, good living, and proper hygienic regulations. The active type of brain congestion in insanity is not commonly a permanent condition; its tendency is to exhaust itself and the patient, and the real curative treatment is properly to be directed to this tendency. While we employ bromides, ergot, etc. to meet the immediate pressing indication, their use should not be continued long enough to lower the vital powers by disordering important functions or benumbing the nervous system. In that form of insanity in which the hyperæmia of the brain is probably most intense, acute delirium, only a vigorous supporting treatment affords any chance for the patient's recovery.

Passive congestion of the brain is not a condition that is always easily recognized in insanity: it probably often exists where it is not diagnosticated, and *vice versâ*. So far as it can be especially treated

there is not usually much difference in the measures to be employed from those used for the active form; warm baths, mild revulsives, bromides, etc. may all be of service.

In the later stages of acute mania, when the excitement has worn off and the patient shows a depressed or stuporous tendency, and in the depressive forms of insanity generally, the brain may be either in an anæmic or in a passively congested condition, and the symptoms may afford no indication as to which of these states is present. It is often, therefore, unadvisable to adopt very active measures based on any theory as to the pathological conditions, except so far as it is not incompatible with either one of them. Supporting treatment—consisting in good feeding; tonics, such as quinine, strychnine, etc.; occasional warm baths, and especially the Turkish bath, in which massage is used to supplement the hot bath; stimulants cautiously used under the direction of the physician; and possibly the use of tonic doses of opium,—is on the whole the safest to follow in those cases in which there is reason to suspect that either of these conditions exists, but when it cannot be decided which. Usually, we may infer that the pathological condition is more probably one of defective nutrition from anæmia and exhaustion; and this presumption may be allowed to have some predominant influence in choosing the course of treatment in cases in which we have to exercise a choice. When there are decided evidences of vaso-motor spasm of the cerebral vessels, as shown by pallor, dilated pupils, coldness of the head and extremities, tinnitus, vertigo, etc., the inhalation of nitrite of amyl is the remedy generally recommended, and its temporary effects are very marked. To be of value in the majority of anæmic cases the inhalations will require to be frequently repeated, and this method of treatment needs to be watched with care, and discontinued at once if there is any sign of its doing harm, such as may possibly follow if the diagnosis of the pathological condition is erroneous. If it is found beneficial and a more prolonged effect of the remedy is desired, nitroglycerin, internally, beginning with one-drop doses of a 1 per cent. solution from one to three times daily, may be employed, and the quantity may be cautiously increased, if found necessary, till four or five drops are taken at a time. It is rarely necessary to exceed this amount, and, in my opinion, the use of this drug should always be commenced with the smallest dose—one drop or even less—and never with several drops. These drugs, nitrite of amyl and nitroglycerin, appear to have a double beneficial action in these cases, dilating the peripheral blood-vessels and strengthening and freeing the heart's action, which is embarrassed by under-innervation or over-inhibition. In patients, however, in which there is any organic cardiac disease or atheromatous condition of the arteries their use is contraindicated, and hence in senile cases special cautions are required.

Alcohol and opium are the two other remedies that have been most generally recommended in anæmic conditions of the brain. I have seen decided benefit from single large doses of alcohol, but am not prepared to recommend it, as its effects have appeared at other times to be the reverse of beneficial. Its continued use is open to very serious objections, and I believe the same to be the case with opium. I have never seen the opium habit created by medical treatment in cases of insanity, but I can readily see how this might occur, especially in the milder neurasthenic types of mental disorder that are most likely to come into the hands of the physician for home treatment. Continued alcoholic medication, such as is likely to be required to be of value in these cases, is even more objectionable, and the responsibility of the physician is matter of serious consideration. When, however, we have to deal with the more pronounced types of mental disorder the conditions are somewhat modified, as the danger of forming or arousing an appetite is lessened, while the necessities of the case may call for all our medical resources. It is as an occasional stimulant, however, in certain depressed and anæmic cases that alcohol is sometimes very useful, and in these, in my opinion, it is most effective when employed on rare occasions only, and its extensive continued employment is seldom beneficial, unless we make an exception of certain senile cases in which the milder alcoholic preparations may be useful. As a vaso-dilator in the stricter sense of the term it has but a limited field of usefulness.

With opium the case is somewhat different: it probably has, in many instances, a favorable action on the blood-vessels of the brain, relieving the vaso-motor spasm and aiding to bring about a more normal condition of the nutrition of the nerve-elements. I have seen apparent benefit from the continued employment of small tonic doses of opium—4 to 4 drops of the deodorized tincture—in depressed anæmic patients, and also from the use of gradually increasing doses. The special indication for its use is either mental or physical pain; hence its value in melancholic states. Experience has not taught me, however, to rely upon it to the extent that some authorities have advised; it is by no means a specific, and I can recommend its employment only experimentally, using caution and watching all its effects. While there appears to be less danger with this drug than with alcohol of creating a morbid tendency or appetite, nevertheless in the milder, and what I may call the "walking," cases of mental disorder, depending upon anæmic and neurasthenic conditions of the brain, it should be prescribed very cautiously, if at all, and the treatment should in all cases be kept well in hand by the physician.

Naturally following the subject of the medical treatment of the disturbances of the cerebral circulation comes that of the management

of the excessive motor excitement or irritability—one of the most prominent symptoms of most congestive and many anæmic conditions of mental disorder. This involves the whole question as to the use of sedatives in insanity, in regard to which there exist wide differences of opinion amongst authorities, and certainly a very wide range of variation in practice. It also includes the question as to the value and propriety of mechanical restraints, which is still to some extent an open one. There is not much doubt that both these methods of treatment have been misused, or rather over-used, in the past, and that the tendency at present is to a much more limited employment of such agencies. In well-appointed hospitals with ample and competent attendance it is possible and desirable to do away almost altogether with mechanical restraint appliances, and the inconveniences that their disuse entails are more than compensated for in other ways. In the management of acute insanity outside of such institutions—for example, in cases of acute mania that have to be treated at their homes, either on account of preferences or prejudices or the impossibility of their admission to an asylum—their use cannot be always avoided; the need of them is one of the greatest disadvantages of such home treatment. From a practical therapeutic point of view they are not useful, save for their moral effect as discipline in some cases; they do not relieve motor excitement, but simply embarrass its manifestations, and the chafing of the patient under the restraint may only aggravate his condition. What is called in hospitals "seclusion"—that is, the isolation and locking up of the patient in a room by himself—is often very useful, though from its liability to abuse it often comes under the same condemnation as restraint. In certain conditions of irritability, when the system needs repose, but excitement is constantly kept up by the slightest irritations, isolation for a time, even in a darkened room, is sometimes the very best treatment. In this matter, as in almost everything else in the treatment of insanity, the utmost consideration must be given to the special needs of each particular case; the treatment must be individual in the fullest sense of the term.

As regards the use of sedatives, otherwise than for their hypnotic effects, there is less difference of opinion, though the term "chemical restraint" has been used in a sense of reproach as applying to their employment to suppress excitement. The fact that motor activity is often not injurious, but positively beneficial and compensatory, does not destroy the other fact that there are many cases in which it is so excessive as to wear out the patient unless checked, and the only way in which this can be done successfully and thoroughly is by the use of sedatives. The question, therefore, has two sides, both of which should be carefully studied. The general rule in regard to the use of sedatives may be stated as follows: When a patient is in a condition of excite-

ment and restlessness that tends of itself to exhaust his vital powers, or is such as effectually to prevent his taking proper nourishment, or is, in any way, under the conditions in which he is unavoidably placed, absolutely detrimental or dangerous to himself and to those who are compelled to be near him, some sedative treatment is not only justifiable, but is necessary. If a patient will take food, a full stomach is often the best of sedatives, but there are occasionally cases where even forcible feeding with the stomach-tube is almost impracticable, especially when with the excitement there are, as often happens, delusive notions in regard to the food. When sedatives are given it is important to see that they are not carried too far; they are more palliative than curative in insanity, and are likely, if too much employed, to do more harm than good. Their use should be discontinued or interrupted whenever it is not positively required for the reasons given above, and careful attention ought to be paid to their general effects on the physical condition of the patient. The general principle that acute insanity requires supporting treatment must not be lost sight of, and no accessory therapeutic measure should be carried so far as seriously to interfere with or embarrass the general nutrition.

When a sedative is required it is a matter of some importance that one is selected which is best suited to the case and least likely to do harm. The condition of the heart and respiratory organs must be particularly considered, as many of the more powerful sedatives have a special action on these organs, and any incautious employment of them may have disastrous consequences. Probably the safest of all sedatives are the bromides of potassium and sodium, especially the former; they seldom have any bad effects when given properly diluted in solution, and they act as an excellent adjuvant to other more powerful quieting agents, enabling us to obtain fuller and more prolonged effects from smaller doses, and thus reducing the danger that might possibly result if the latter were employed alone in quantities sufficient to produce the desired effect. The prolonged use of the bromides, it is well known, has its disadvantages, but this is not to be counted on as necessary in the treatment of the excitement of simple acute insanity. I have often seen thirty grains of the bromide of potassium alone have very excellent effects in quieting an excited maniac; but as a rule I have employed it in such cases in combination. Clouston recommends it used with tincture of cannabis indica as the very best general sedative. Cannabis indica itself is often too uncertain; the preparations are not always reliable; and the same may be said of conium, which is, aside from this objection, one of the best of the motor depressants. A combination that has been found very serviceable in quieting excited patients is from 10 to 15 drops each of Squibb's fluid extract of conium and hyoscyamus and 10 or 15 grains of chloral. The

effect of the conium on the motor excitement seems to be especially manifest in this combination. I have seen gelsemium employed, and have used it to a slight extent to reduce motor excitement, but it is a less desirable remedy, in that it is a powerful cardiac depressant, and its use requires great caution in any case. The use of tartar emetic in these conditions is almost entirely obsolete, yet it has been recommended of late years by Bucknill and Tuke and by T. W. Fisher, who find it advantageous in $\frac{1}{4}$-grain doses three times a day. I have no experience with it, and would prefer other agents. Hyoscine in the form of the hydrobromate or hydrochlorate, employed hypodermically, has recently come into use, and is a very efficient pure motor depressant—probably the most efficient; but its use, like that of the other powerful alkaloids, requires great caution: not over $\frac{1}{100}$ of a grain is advisable at a dose. Hyoscyamine is a somewhat older drug that has been very extensively employed, and in rather perilously large doses, by some physicians. One-fiftieth of a grain is as much as should be ordinarily used hypodermically; in this dose it is often sufficient to quiet an excited patient. In some cases in women I have seen sulphonal employed in 10-grain doses three times a day with apparent advantage, the drug apparently acting as a general sedative and not especially as a hypnotic.

It is often observed in asylums that when the patients can be kept out of doors largely the average of disturbance and excitement is very greatly reduced. It will be also found that in individual cases free air and exercise during the day are among the most efficient general sedatives, especially when with this the patient takes plenty of nourishing food. In caring for excited patients at home or outside of a hospital this out-of-door treatment, when good attendants can be had, is often one of the very best measures both for meeting the present difficulties of the situation and in tending to the ultimate cure.

Hallucinations and delusions, the most characteristic, and in common opinion the essential, symptoms of insanity, are not, as a rule, directly amenable to medicinal treatment. They are simply indications of the existing disorder of the brain; they are special symptoms of a general condition of disease of that organ to which we direct our treatment. Some authorities, more particularly the older ones, have recommended certain drugs, such as stramonium and belladonna, as favorably influencing hallucinations, but as all these belong to the general class of anæsthetics and partial benumbers of consciousness, it is probable that whatever influence they may have is exercised in this way, and the actual benefit is doubtful. When hallucinations are especially persistent and localized in one or more of the sense-organs, and particularly if they are unilateral, it is well to look specially for local disease that may directly or reflexly have to do with their production. It may be

found that some local aural disease or some visceral irritation has only to be treated to cause them to disappear. In the great majority of cases, however, the mechanism of hallucinations is beyond our reach by any treatment specially directed to them; they sometimes disappear very quickly with the use of remedies and measures adapted to the relief of the general morbid conditions presumed to exist in the brain, but we cannot name those that will directly act on the special sensory centres involved. The suggestion that has been made to treat hallucinations surgically by trephining does not recommend itself for practical application. Delusions are entirely beyond the reach of drugs, and moral and regimenal measures have only an indirect and uncertain effect in aiding in their removal. If certain psychological theories as to the mutual relation and interdependence of muscular action and ideation are accepted as correct, there is a possible suggestion of a kinotherapeusis that might be available for their relief. It is only a suggestion, however, as yet, and the possibility of its having any practical value may never perhaps be demonstrated. When it is practicable, nevertheless, properly selected and directed employment has its advantages; and it should be such as will divert the patient's mind from his delusions. I have known a paranoiac, with a fixed delusion of many years' standing that he was the Deity, begin to recognize an inconsistency between his ideas and the daily manual labor at which he was put, and from that moment began a gradual but finally complete disappearance of the delusion and a satisfactory recovery. Of course such instances are rare, and it is very possible that other influences had to do with the outcome of the case; but if there is any way of treating the symptom of insane delusions directly, it is by judiciously directed rational employment. It is the delusional tendency and the defective power of judgment that have to be remedied, and it can only be in rare instances that special measures, either moral or physical, directed to the delusions themselves can have any favorable results.

A common and very aggravating series of symptoms in insanity are due to special excitement in the genesic sphere. These symptoms are indications of morbid irritation as well as of defect of moral inhibition, and, so far as they are due to the former cause, special treatment is to some extent available for their relief. If the irritation is peripheral, as happens to be the case sometimes, with females especially, such special or local treatment as will relieve the condition is of course indicated. It must be kept in mind, however, that when the origin of the condition is solely in the central brain disorder, there is apt to be a tendency in sexually excited females to call for local treatment. It is well in any case to observe closely the condition of the bowels and of the stomach, as it is not infrequently the case, in my opinion, that disordered conditions of these organs may at least aggravate or keep up

the genital excitement. Pruritus of the anus, which is a very common neurotic complication of disordered bowels and digestion, is also a genital excitant, and has been responsible, I believe, for the habit of masturbation in some cases that have come under my observation. Medicines alone are not to be relied upon, though they are often useful adjuvants to other treatment. The bromides have been usually considered the most reliable antaphrodisiacs, but opium, camphor, monobromate of camphor, and numerous other drugs have also been recommended. Local applications, such as blisters, have been very largely used, and have a certain moral effect in some cases, but otherwise the good they do is only temporary, and sometimes they appear only to aggravate the condition. The same may be said of mechanical restraint, which has been often employed. In extreme cases, in both sexes, castration has been resorted to, but the results have not, in the instances that have come to my knowledge, justified the practice, at least not so far as any permanent benefit to the general mental condition of the patient was obtained. It seems, indeed, to be more favorable to ultimate dementia than to anything else. The bad habits of the insane in this respect can be best combated by thorough watching during the day, and, when it is possible and not contraindicated by the physical condition, by such bodily exercise or work as will fully occupy the patient and produce a healthy fatigue that ensures sound sleep at night. This, with a regulated, not too stimulating diet, cold baths, etc., and suitable moral treatment, forms the best means for controlling the vice in the class of cases in which it usually is most frequent. These are commonly the chronic or slowly-developing types: when strong sexual excitement appears as a symptom of acute insanity, it is usually to be treated with the other symptoms of general excitement and by the same remedial measures.

From what has been already said in regard to the exhausting and depressing action of insanity on the whole system, it will be easily understood that tonics fill a large place in the general treatment of mental disorders. Under this head may be included not merely drugs, but also such general and special remedies as baths, massage, electricity, gymnastic exercises, and even travel and change of climate. All these have their advantages in certain cases, and some of them are especially useful. It is in the depressive forms of insanity and in the reaction stages of acute mania, when symptoms of exhaustion begin to appear, that treatment with tonics is especially indicated, but they are often beneficial throughout the whole course of acute attacks of insanity, whether of the depressive types or otherwise. The medicinal agents that stand highest in this class according to their usefulness in insanity are the cinchona preparations and alkaloids and strychnine. As general tonics the former of these in their various preparations are undoubtedly

the best we have, and it does not seem probable that they will be ever altogether superseded by any other. Besides being a general tonic, strychnine has a special stimulant action on the nervous system, which, as Spitzka has pointed out, is not exercised solely on the spinal cord. Neither of these agents should be used in large doses. I have observed, indeed, the best effects when the quantities given were comparatively small. A very good combination for administering both together in combination with iron, which is naturally indicated in many conditions in the insane, is the elixir of calisaya, iron, and strychnine of the National Formulary, which contains several of the cinchona alkaloids in small quantities, together with about 2 grains of the pyrophosphate of iron and $\frac{1}{100}$ of a grain of strychnine to the fluidrachm. Iron may be given by itself in any form that may seem desirable; it is as efficient probably in the tincture of the chloride as in any other preparation. Kowalewsky recommends the peptonates as especially useful in stuporous melancholia. Arsenic is also a valuable tonic in insanity, and it appears to have occasionally some special effect on the mental condition, brightening it up in cases of melancholia, as well as physically toning up the system. From 1 to 3 drops of Fowler's solution two or three times daily is probably a sufficient quantity from which to obtain the good effects of the remedy in such cases. It can be administered either alone or with small tonic doses of opium—from 3 to 5 drops of the deodorized tincture. I have, as already stated, used these last in melancholia, and sometimes with advantage. To counteract any constipating tendency of the opium, moderate doses of some general mild laxative, such as cascara, were frequently given at the same time. Another tonic with special properties in depressive conditions is erythroxylon coca, and very small doses of its alkaloid, cocaine, have also been recommended as beneficial. These need not be continued over any length of time, however, unless they are found decidedly useful. The mineral acids also are often useful, especially when there is loss of appetite and atonic indigestion in mild cases of melancholia, and I have employed the popular preparation known as Horsford's acid phosphate quite extensively in such cases in doses of half a drachm or more.

The food-tonics, cod-liver oil, extracts of malt, etc., are also of great value in insanity, especially the former, which can be used in all conditions of nervous exhaustion and debility when a nerve-tonic is required and when it does not unfavorably affect the appetite. The compound syrup of the hypophosphites is also an excellent nerve-tonic and general restorative in such conditions, and is probably as satisfactory a means of obtaining the beneficial effects of phosphorus upon the system as any other.

Baths play a very important part in the therapeutics of insanity. Mention has been already made of the utility of warm baths in conditions

of excitement, especially when combined with cold applications or affusions to the head. The wet pack has also a very powerful calmative action, but is at present not very largely used in asylums, possibly owing to a prejudice that has come to us from England on account of its ready applicability as a means of restraint. In the home treatment of excited patients it may be very useful, but its effects need watching. The shower-bath also is a powerful tonic and revulsant that has been brought into discredit in the treatment of insanity on account of former abuses. Bucknill and Tuke recommend its occasional employment in melancholia, the duration of each time being from fifteen to thirty seconds. The tonic effect of cool baths (temperature of 60°–75° F.), and even of cool sponging in the early morning, is very useful in many of the milder neurasthenic cases of melancholia.

Warm baths and the wet pack are powerful excitants of the functions of the skin, but still more efficient are the vapor baths, the Russian and the Turkish baths. The former of these is a simple vapor bath, ending generally with a cold douche or shower-bath; the latter is essentially the same, though dry heat is more employed, but combined with physical massage. It has therefore some advantages, and is very highly recommended by T. W. Fisher, who says: "From our experience with this remedy we consider it especially applicable in the following class of cases: In melancholia, with the skin dry, harsh, and of furfuraceous aspect; in primary dementia, in which the capillary circulation is greatly impaired, the excretory functions of the skin are suppressed, and the whole surface has a cyanotic appearance; in alcoholic mania, with organic weakness of the liver and kidneys and with tendency to anasarca; in epileptic mania, where the physical disease is masked and exacerbations of mental disturbance take the place of the convulsions; in cases in which there is restless excitement with hyperæsthesia of the skin, tactile illusions, and perverted sensations of the peripheral nerves; acute and chronic mania, as an effectual sedative to violent excitement where narcotics are contraindicated; in a numerous class of cases in which the manipulations of the bath afford an admirable passive exercise, which is a substitute for the more active exertion which the patient is unwilling or unable to make, either indoors or in the open air; in cases of organic disease of the brain, heart, or lungs it is a valuable adjuvant in palliative treatment, but it must be used very guardedly. The same caution is not required in cerebral congestion due to functional derangement, in which its use is followed by marked relief."

The foregoing appears to sum up nearly or quite all of the conditions in which the Turkish bath can be expected to be of decided benefit; it is undoubtedly a powerful therapeutic agent, and when available may often prove a valuable adjunct to other methods of treatment.

The very prolonged warm baths combined with the cold douche recommended by French writers, notably by Brierre de Boismont and others, require special attention. Brierre de Boismont says that by them "all forms of insanity, and mania in particular, may (often) be cured within one or two weeks." He recommends that their temperature be between 75° and 85° F., and that the patient be kept in them eleven or twelve hours at a time, even extending this in some cases to eighteen hours. Notwithstanding the high authority recommending this practice, and the fact that it is mentioned without criticism by some recent authors, it is not one that ought, in my opinion, to be often followed, and the objections of Bucknill and Tuke are valid and amply justified. There is no doubt of the effectiveness of these prolonged baths in many cases of mania, but there are decided inconveniences in their employment, and some serious dangers that cannot be always foreseen. It will probably be found easier, safer, and equally advantageous in the great majority of cases to employ other methods of treating excited patients. The occasional use of slightly warm or tepid baths of an hour or even longer may, however, in some cases give excellent results and possibly succeed where other measures have failed.

Massage, or systematic friction, kneading, etc., so as to give thorough passive exercise to the muscles and quicken the circulation and stimulate the functions of the bodily organs, is by itself frequently of decided advantage in many depressed conditions of mental disorder. In excited or in ordinary demented conditions or in delusional insanity it is not specially indicated, and if employed may even do harm. I have seen the best effects from its employment in cases of mild melancholia with considerable bodily weakness and inactivity; and in these it seems sometimes to exert a directly favorable influence on the mental state. The physical symptoms, however, are the main indications to be followed in determining whether it is to be used, and its effects on the mental condition should be watched. In cases of extreme depression it is hardly likely to do good, especially if there is any tendency to agitation; its greatest value is probably to be found in the milder neurasthenic types of mental disease, and probably in stuporous insanity.

Electricity is an agent from which very much has been expected in the treatment of insanity, and in regard to which there is considerable difference of opinion. Some writers have claimed very remarkable results from its use, such as the cure of cases of many years' standing by cerebral galvanization, while others find it of very limited applicability in any form of mental disorder. There are, however, one or two points in regard to its employment in these cases that may be considered as established: one of these is the tonic action of what has been

named general faradization, and another is the soothing and almost hypnotic action of a modification of the same process in some slightly irritable cases of the neurasthenic type. The regular way of employing general faradization is to apply one broad moist electrode to the feet or buttocks, and to pass the other generally and systematically over the skin of the other portions of the body. To obtain the best effects from this procedure it is not necessary that every part of the body should come under the electrode, but the application should be rather general. If for any reason this is impracticable or inconvenient, very good results may be often obtained by passing the current through the body steadily for ten to twenty minutes from the back of the neck to the feet. This is practically a simpler form of general faradization, and I have found it very useful in a number of patients who suffered from sleeplessness from irritability and physical weakness. The current in general faradization should be rather finely interrupted and unirritating, and its strength should be only such as is easily and pleasantly borne by the patient. Schuele speaks highly of the advantages of this method in cases of hysterical melancholia in patients of "relaxed fibre," and Krafft-Ebing considers it a tonic of the very first rank. The action of the faradic current thus applied is more superficial and general than by other methods, and it is therefore safer as a rule than the deeper-acting galvanic current. The latter has generally been employed in insanity in the form of cerebral galvanization, in which the current is passed through the head either antero-posteriorly or transversely, or the same general effects are produced by what is called galvanization of the sympathetic, in which one pole is placed generally on the neck, over the superior cervical ganglion, and the other over the lower cervical vertebra or on some portion of the body. The action of the galvanic current on the brain appears to be to reduce the calibre of the blood-vessels and to be soothing and hypnotic. It would seem therefore best adapted to congestive conditions, but the impossibility of always correctly diagnosing the conditions within the brain, as well as the somewhat uncertain and yet powerful action of the current on the brain, should make us cautious in its employment. It has, nevertheless, been recommended in melancholia as well as in mania, and in the incipient stages of paretic dementia. Cerebral galvanization may, without much question, be considered as liable to affect the brain profoundly, but galvanization of the sympathetic has very similar effects, and is in most cases a preferable method of employing the constant current. If either method, and especially if the former, is used, the applications should be of short duration, the electrode if applied to the head should be not too small and be well moistened, and the current should be a minimal one at the beginning, and if increased at all it should be very cautiously and gradually. A current-graduator

and milliampèremeter are desirable accessories in any case where galvanization of the head is employed.

Of late years much has been written and reported in regard to the use of hypnotism as a therapeutic agent, especially in France, and some apparently extravagant claims have been made of its efficacy in mental disorders. It is probable that in many of the cases in which cures or apparent benefits have been reported from the use of hypnotism enough time has not been taken to ascertain whether the effects were permanent, and that the alleged cures or ameliorations were not merely the temporary changes that often occur under any unusual stimulus or excitation. The fact, too, that it has been found of most benefit in hysterical and hypochondriacal individuals, or in patients in whose insanity there existed a more or less pronounced hysterical tendency, as is very often the case in all forms, and especially in epileptics, also points this way. The changes thus brought about may nevertheless be permanent, as every alienist has observed; and, accepting only this view of hypnotism as a therapeutic agent, it is not to be altogether neglected. It is, however, suggestive in other ways: considering it, as we should, as an induced trance state in which the differently functioning organs of the brain can be separately brought into action, involving necessarily special molecular nervous action, and probably changes in the local circulation, each of which is developed and made to disappear at the will of the operator, it would seem as if it might possibly be made a very powerful agency in the hands of one skilled in its use, of value in nearly all phases of curable mental disorder. On the other hand, it is the employment of the production of one pathological condition to modify or counteract another, and instead of the desired result there may be from its use an intensification or only a useless modification of the existing morbid tendencies. The great practical difficulty in utilizing it is the fact that the vast majority of the insane are less susceptible to hypnotization by the ordinary methods employed than are normal individuals; they lack the power of abstraction from surroundings or are more incapable of fixed attention; and when it is successfully induced the trance state is often less deep and permanent, and they are less open to suggestions than are the sane under the same conditions.

Hypnotism is undoubtedly occasionally useful in hysterical cases, and it may also possibly exert a beneficial influence in other forms of mental derangement. I have seen a sitiophobic tendency apparently broken up by its employment in one instance, and in another case of paranoia a hypnotic séance appeared to have some effect in hastening recovery. To a hysterical melancholiac it appeared to be positively damaging. In a few other patients who seemed more or less susceptible the results were negative, and in the great majority there appeared

to be an incapacity to pass into the trance condition. Hypnotism as a therapeutic agency is still in the experimental stage: it may develop into something of value, but the remarkable results reported by Voisin, Luys, and others cannot at present be confidently expected by ordinary experimenters.

In attempting to hypnotize insane patients some such apparatus as the revolving mirror devised by the French investigators is almost essential, as the ordinary method of using a stationary bright object, which the subject holds in his hand, is hardly sufficiently impressive and requires more steadiness and patience than the insane can usually command. As to the use of magnets, etc., as employed by Luys and others, I can say nothing from experience, and must confess to a lack of faith in their therapeutic value other than through the moral effect of such paraphernalia upon hysterical and credulous patients.

From hypnotism to the moral treatment of insanity is a natural transition in many respects. The latter, however, is a very extensive subject which cannot be fully treated of within the limits of this article, and I can only briefly touch on a few important points. In the first place, individual treatment—by which is meant the proper adaptation of all conduct and measures to the special needs of each particular case—is essential in the psychical management of the insane: a great deal depends upon the tact and skilled judgment of the physician and others to whom their case is entrusted. It is difficult, for this reason, to lay down rules of conduct to insane patients, as these will have to vary more or less according to the conditions of each individual case. In a general way, it may be said that the more nearly we can treat the insane as rational beings the better—not ignoring their insanity, but considering it as a physical disease, in the treatment of which one should, as far as possible, secure their personal co-operation. The majority of the insane have more or less an idea of the opinion of others as to their mental condition, and will have no less respect for one who, while understanding their ailment, nevertheless shows in all ways a kindly consideration and recognition of whatever good judgment and self-control they may possess.

It has been said that acute insanity in its early stages is not amenable to moral treatment. In its fullest sense this statement is not correct, for there are few conditions of insanity, hardly excepting even epileptic furor, that are not to some extent susceptible to moral control—a fact that is daily demonstrated in every well-managed asylum. It is true, however, that it is in the later stages and in the less violent types that psychic treatment comes most largely into play, including under this term everything that can be employed to influence the disease favorably through the action of the mind on the body. In patients

in whom no bodily symptoms can be found to be treated, who are in as nearly perfect physical health as is the fortunate lot of healthy sane individuals, moral treatment is naturally the only resource. As the most important and most universally applicable method we may class rational occupation. There is nothing that can be found that is more practicable or more beneficial in the vast majority of cases of non-acute mental disorder.

Something must be said in regard to artifice or deception and to discipline in the management of the insane. The first of these is so generally practised by the laity in their dealings with these unfortunates that it is hard to assume conditions where it is really required to be employed by the skilled physician who has anything in the way of assistance to carry out his necessary orders. Perfect frankness is not always advisable, but deliberate deception is, to say the least, very rarely useful, and is apt to be disadvantageous to those who use it, especially in any long-continued intercourse with the patient deceived. As a general rule, it is well to impress the fact of the reliability, if not of the invariable sincerity, of the physician upon the patient's mind.

While anything of the nature of vindictive punishment or intimidation is in the highest degree undesirable in the management of the insane, it is necessary to exercise control and to check them in their dangerous or improper behavior, and to prevent its recurrence as far as possible. The impaired ethical sensibility and lack of the normal moral inhibition that lead to these acts are, as regards the management of the patients, largely compensated for by the lack of the higher kind of physical bravery in the insane and their increased impressibility. In large hospitals, or indeed in nearly all well-managed institutions for their care, the regular order and atmosphere of the place has often a happy effect in inciting the self-control of the patients, and the necessary classification and changes of wards afford all that is required in the way of discipline. In treating patients at home, however, there are many difficulties, and severer methods in the way of confinement and physical restraint are often necessary, and may act not only as preventives of mischief, but also, after a fashion, as disciplinary measures, as has been already mentioned. Good judgment and tact on the part of the attendants are nevertheless the main dependence in these as in all other cases: there are comparatively few of the insane who cannot be easily controlled by properly qualified and skilled attendants.

## Treatment of the Different Forms of Insanity.

The special treatment of the different forms of insanity can, for the most part, be passed over rather rapidly, as the main points of their management have been already stated in the preceding pages. Only one or two forms will require very extended mention.

**Acute Mania.**—The therapeutics of acute mania has been given sufficiently in detail in what has been already said on the general treatment of insanity; it can be summed up as follows: Proper control of the patient, and, preferably, treatment in a hospital for the insane; attention to the nutrition and the excretions; hypnotics and sedatives, used with judgment and due caution; in many cases exercise or employment in the open air, to work off motor excitement; warm baths, prolonged if necessary, with or without cold applications to head. In the reaction stages nutrition, tonics, etc.

Some recoveries from acute mania occur within a few days or weeks; other cases drag along, with alternating remissions and relapses, for months or even years. If there is in any form of mental disorder a crisis or turning-point, where the proper treatment may turn the scale in favor of recovery, it is this, but it is not to be predicted in any single case, and its occurrence cannot be said to be the rule. It has been customary in asylums to consider all cases of more than a year's duration as having passed into the chronic and presumably incurable stage; but this rule is a purely arbitrary one, as the hopelessness of the disorder depends upon the amount of damage to the brain, and not upon the length of time that has elapsed since its beginning. The usual duration of favorable cases is certainly less than twelve months, but I have repeatedly seen recoveries after a year, and in one exceptional instance the symptoms of acute mania were almost continuous for over two years, and then the patient made a satisfactory and lasting recovery.

**Melancholia.**—In melancholic conditions the general indications are—rest, quiet, special attention to the condition of the bowels and of the alimentary canal generally, good feeding (by the stomach-tube if necessary), the procurement of sufficient sleep, and, most particularly, watchfulness against suicidal or homicidal attempts. The direct medicinal agents to be employed are mostly hypnotics and tonics, but in agitated melancholia and in all cases of the strongly neuralgic type with præcordial pain, etc., analgesics are indicated. The principal one of these, and one which has been considered as almost a specific, is opium, usually given in gradually increasing doses. The writer does not personally recommend this treatment of carrying the dose of opium to a large quantity taken daily as tolerance is obtained, but it has much authority in its favor. In using morphine hypodermically in these cases I have carried the dose up to $\frac{2}{3}$ of a grain at each injection, and then seen apparently equally good effects on the patient's mental condition from the injection of pure water, with which I occasionally alternated the dose. In melancholia with strong hysterical or hypochondriacal tendencies opium is not the best remedy, and is in my opinion contra-indicated.

Spitzka speaks highly of the efficacy of occasional full doses of

cannabis indica in melancholia, and I have thought I have used it thus with benefit at times. Another remedy that has been stated to have a favorable effect on depressed mental conditions is chloride of gold, but I have not found it particularly useful in the trials I have made with it in these cases.

Attention to the condition of the bowels is, as has been already stated, of the utmost importance in melancholia—more so, indeed, than in any other form of insanity. I have in some cases seen decided improvement follow the use of copious regular daily injections carried on for a week or ten days at a time, and then intermitted for a while or discontinued. Some French authorities (Regis, Voisin, and others) have recently recommended and reported great benefit from thorough irrigation or washing out of the stomach, especially in the relief of the troublesome symptom of sitiophobia. They hold that in these cases there is a catarrhal gastric disorder, and to this is to be attributed, in great part, the mental disorder. Regis, indeed, advises, in addition, the use of disinfectants, and claims to have had excellent results from the employment in these stomach "lavages" of the insoluble antiseptics, such as naphthol, salicylic acid, etc., in suspension with mucilage and sugar. The suggestion is worth considering, and it is possible that much good may be accomplished by disinfection of the whole alimentary canal—the stomach by this method, and the bowels as suggested in the earlier part of this article.

Absolute rest in bed is useful in the early stages of many cases of melancholia, and is more applicable in this than in most other forms of insanity where it has been recommended. Its effects are in many of these cases directly curative, and it decidedly facilitates other treatment. Combined with systematic massage and a specially regulated diet, largely of milk, it forms the well-known Weir Mitchell rest-cure, which is particularly applicable to certain forms of neurasthenic mental depression, particularly in women.

When there is, with either depression or excitement, but generally with a depressed physical condition, a marked wandering, hallucinatory delirium, especially if in connection with the puerperal state, there is apt to be a strong suspicion of blood-poisoning, which may afford valuable indications as regards the treatment of the case.

**Acute Dementia, Paranoia, and Cyclic Insanity.**—Acute dementia, paranoia, and the various forms and phases of cyclical insanity, so far as they are amenable to medical treatment, are to be managed according to the general principles already laid down. There is apt to be in paranoia, and especially in the circular or periodic insanity, a strong hereditary or a neurotic taint, which renders the prospects of permanent cure less favorable. Cases of paranoia do, however, not infrequently make a good recovery, but it is impossible

to lay down general or special rules for bringing about this result. Aside from the general principles already stated of searching for and removing, if possible, the cause, and using the proper remedies for all existing morbid bodily conditions, the treatment must be individual and to a large extent moral. The same may be said to be true in the main of hysterical insanity: there is no specific medical treatment for it; its multiform phases may call for the most varied remedial measures, and psychic treatment is often of the highest importance.

**Epileptic Insanity.**—When the mental disorder is connected with or caused by epilepsy, so that it can properly be called epileptic insanity, the neurosis gives the indication for treatment, and in a very large majority of all these cases the bromides are indispensable. It is commonly held that epileptic insanity is a hopeless disease as regards recovery—this, I think, is an error—but there is no question whatever as to the possibility of its being greatly ameliorated and its most dangerous symptoms controlled to a very large extent; hence the importance of proper medical treatment. This is to be directed mainly to the epilepsy, and for this the bromides are the principal dependence. I have not found it necessary, except in cases of extreme severity, to employ such large quantities of these drugs as are often recommended: from 1 to 1½ drachms daily of the potassium or sodium salts in three or four doses has usually been found sufficient. Sometimes a combination of the bromides of potassium and ammonium appears to have its advantages over the former used alone, as not producing the symptoms of bromism so readily. In a few cases large doses of the bromides seemed to bring on the maniacal symptoms, and I have had to discontinue their use altogether on this account in one or two instances. Usually, however, epileptics bear these remedies very well, especially if given well diluted in some alkaline solution. Féré and Galippe have recently stated that the administration of naphthol internally with the bromides prevents some of the unpleasant bromic symptoms, the skin lesions, and the gastric catarrh. It is sometimes useful to intermit the bromides for a while, especially if symptoms of decided bromism are persistent.

Under the bromide treatment the epilepsy is ameliorated, and the maniacal or other insane symptoms which are usually connected with the attacks are lessened or avoided. In one instance, at least, under this treatment I have seen a once-dangerous epileptic apparently restored to perfect health, no symptom of the disease having shown itself for a number of years. Such cures are very rare, but there are more cases in which epileptic insanity does not recur, though the epilepsy still continues in a mitigated form.

Besides the three principal bromide salts, there are no remedies that have any special efficacy in epileptic insanity. Of course whatever is of use in epilepsy is often of advantage, but nothing else is so

generally reliable. In a few instances I have found that the bromides were not tolerated, especially in any quantity, because they had a tendency to aggravate the mental symptoms, and even to bring on the maniacal condition. Where this idiosyncrasy exists, other remedies, such as nitro-glycerin, are occasionally of value; but in some of these cases I have found that no special anti-epileptic treatment, other than care as to the diet and general physical condition, was of any particular advantage. Such patients are, however, quite exceptional, and in no way impair the general rule as to the importance of active medication in epileptic insanity.

Cases have been reported of epileptic insanity cured by operative surgical procedures. It is possible that an operation might be indicated and successful if the insanity depended upon an epilepsy due to a comparatively recent traumatism, but under other conditions it is at least doubtful; and in all cases sufficient time should be allowed to elapse before announcing a cure. In most epileptics—and this applies also to insane epileptics—anything that produces a strong physical and mental impression upon the patient may temporarily suspend or modify the symptoms and cause an apparent betterment or cure; and this should be taken into account in estimating recoveries from operative procedures. Out of quite a number of insane epileptics that I have known to have been trephined or otherwise operated upon for the disease, I cannot recall a single case of permanent recovery.

The diet in epileptic insanity needs careful attention, the more so since many of the patients have inordinate appetites. It should not be too stimulating, and with robust patients it is a good practice to cut off most animal food and restrict them to a vegetable and milk diet. Stimulants of all kinds, even tea and coffee, are liable to do harm, and tobacco is often particularly hurtful. Alcoholic stimulants, even in their milder forms, should be positively prohibited.

**Paretic Dementia.**—Paretic dementia—or, as it has been commonly called, general paralysis—is another species of insanity that calls for some special mention as regards its medical treatment. It is probable that the great majority, if not quite all, cases of this disease, if all the facts could be fully ascertained, would be found to have had antecedent syphilis, and the relation between the two disorders is in such cases probably more than an accidental one. This is possibly the explanation of the fact that the iodides exercise a most beneficial effect in many cases of this disorder. It is a good plan to administer, in all cases of paresis when there is no decided reason to the contrary, moderate doses of iodide of potassium—8 to 15 grains—three times daily, combined with tonics if necessary, until the treatment is found useless or is in some way contraindicated. The earlier in the disease it can be given the better, but it is not infrequently of advantage in

advanced stages of paresis. While a cure can hardly be expected, decided amelioration frequently follows this medication, the symptoms improve, and long remissions occur. Of late years a number of well-attested cures have been reported, some of them directly from anti-syphilitic treatment.

Powerful revulsives—blisters, setons, etc.—have been recommended, even carrying blistering of the scalp to the extent of producing necrosis of the cranial bones, but I cannot speak from favorable experience with such remedial measures. If they are employed, it is safe to say it should be with due caution and avoiding dangerous extremes.

**Chronic Insanity.**—The management of chronic insanity, except in the case of such harmless lunatics as can be cared for without any special medical oversight, falls more properly under the head of hospital or asylum treatment of the insane. Acute exacerbations, when they occur, can be treated according to the general principles already stated. A few special symptoms, such as troublesome sialorrhœa of certain old dements, othæmatoma, etc., are mostly met with in old or presumably hopeless stages of insanity, but this is not invariably the case. The salivation can be controlled, if necessary, by atropine, at least for a time, and it is possible that some good may follow minute punctures of the ear-tumor to relieve the pressure; but this will not ensure against deformity. These, with the asphyxias and gangrene of the extremities, the decubitus, the disorders of the bones, etc. in such patients, are only indications of central disease and a generally depraved condition of the system, and any treatment specially directed to them can be hardly more than palliative.

One thing should be borne in mind in any case of chronic insanity when the bodily health keeps fair, and that is to watch for improvement in the mental condition. Sometimes, even in those cases that appear most unfavorable as regards the prospect of a cure, a happy change appears, and recoveries in these conditions have come under the observation of almost every alienist of long experience. No case of insanity in which we cannot with certainty diagnose irreparable organic disease of the brain is to be considered absolutely hopeless.

# CHOREA.

By B. SACHS, M. D.

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Chorea is a spasmodic neurosis, to be distinguished from other spasmodic affections by frequent, irregular involuntary movements of many groups of muscles. The muscles of the arms, legs, face, and the tongue are generally involved, but all these jerking and twitching movements are apt to cease during sleep.

American and English authors speak of the disease simply as chorea; St. Vitus' dance is the more popular designation. German authors designate it as chorea minor, in contradistinction to chorea magna, a rather rare hysterical disorder. Those who are in favor of perpetuating famous names in the nomenclature of disease still speak of the disease as Sydenham's chorea.

Before considering the treatment of this neurosis it will be well to insist on a few facts without the knowledge of which rational treatment of the disease would be quite impossible.

Chorea, then, is a neurosis of early life, the largest number of cases occurring between the ages of five and fifteen years.[1] The greatest number of attacks occur in the thirteenth year of life, but attacks occurring in the first three years of life are not unknown. The disease affects girls more frequently than boys: according to Gowers, out of 1000 cases of chorea only 365 were boys.

Chorea may result from fright or it may follow upon heart disease, acute rheumatism, and other acute infectious diseases; it occurs also, or at least reoccurs, during pregnancy. Fright or some form of emotional excitement has been a pronounced factor in 52 out of 100 cases which I have tabulated. The choreic movements may be developed within a few hours or a few days of such an occurrence. In children who have had chorea a very slight occurrence (a severe scolding, for instance) may be sufficient to bring on an attack. Authors are still at variance as to the part which acute rheumatism plays in the causation of this disease. In about one-fourth of the cases tabulated in the

[1] This is based upon the statistics collected by Dr. Stephen Mackenzie for the British Medical Association Collective Investigation Committee (*British Med. Journal*, Feb., 1887). For further details the reader is referred to the article on chorea by Dr. Sinkler in Pepper's *System of Medicine*, and to the one by the present author in Keating's *Cyclopædia of Diseases of Children*.

larger statistics of Seé,[1] Roger,[2] Mackenzie,[3] and Gowers[4] an attack of acute rheumatism preceded the onset of the chorea; but both chorea and acute rheumatism occur so frequently that we are apt to mistake a mere coincidence of the two diseases for a causal relation between the two. Romberg, Niemeyer, Sinkler, and myself have found a satisfactory history of rheumatism in a much smaller percentage of cases. I could not claim such an antecedent history in more than 17 per cent. of my cases.

Very much the same may be said of the relation between heart disease and chorea. Mackenzie claims this history in one-quarter to one-half of the cases. I have found it in 15 per cent. of my cases.

**Chorea Gravidarum** is developed most frequently in the third month of pregnancy, and, as a rule, only in those women who have had chorea during childhood.

Morris Lewis[5] and Weir Mitchell[6] have shown that the fewest choreic attacks occurred in October and the greatest number in March: these authors have also maintained that there was a correspondence between the number of attacks of chorea, the number of rainy and cloudy days, and the number of storm-centres that passed over Philadelphia.

**Reflex Chorea** is a not infrequent diagnosis, but it is extremely doubtful whether such cases are of actual reflex origin. Nasal and ocular diseases sometimes give rise to habit-choreas or habit-spasms (Gowers): these often persist after the local disorder has been removed, and, if curable at all, yield more readily to the general choreic treatment than to local measures. I do not wish to deny, however, that intestinal parasites may give rise to chorea, as they surely cause epileptic attacks in some persons. In a previous paper I have mentioned the rather rare occurrence of severe chorea in a woman of forty years suffering from carcinoma uteri and epilepsy. Chorea was developed in this case after the cessation of epileptic attacks.

"The true *pathology* of chorea is still unknown." This statement, made a few years ago, can be maintained with equal force to-day. The older authors (Ogle,[7] Pye-Smith[8]) and some more recent writers (Dana,[9] for instance) speak of intense cerebral and spinal hyperæmia. Meynert[10] and Ellischer[11] laid some stress upon a hyaline degeneration in the nerve-cells of the central ganglia; Hughlings Jackson[12] favors the embolic origin of chorea, and considers it a cerebral disease; but Gowers has failed to find emboli in the brains of choreic individuals. On

[1] *Mém. de l'Acad.*, xv., 1850.
[2] Roger, *Arch. gén. de Méd.*, 1886, xii.
[3] *Loc. cit.*
[4] *Manual of Diseases of the Nervous System.*
[5] *The Polyclinic*, Jan., 1887.
[6] *Lectures on Nervous Diseases.*
[7] *Brit. and For. Med.-Chir. Rev*, 1868.
[8] *Guy's Hosp. Reports*, 1874.
[9] *Med. Rec.*, Oct. 19, 1889.
[10] *Allg. Wien. Med. Ztg.*, 1868.
[11] *Ziemssen's Cyclop.*, vol. xiv.
[12] *Brit. Med. Journal*, Dec., 1876.

the other hand, Angel Money[1] was able to produce movements resembling those of chorea by injections into the carotids of animals; and this condition was associated with capillary embolism of the brain and cord. Other findings have been reported by Golgi,[2] Lockhart Clarke, Garrod,[3] and many other observers.

Ellischer and Flechsig[4] found amyloid bodies in the globus pallidus of choreic individuals. Wollenberg[5] has shown conclusively that these bodies occur in the brains of persons who never exhibited choreic movements during life.

After consideration of these various pathological findings we cannot at present do more than express the belief that chorea is a form of functional exhaustion of the central nervous system, that this exhaustion may follow upon any exhausting disease, and that it may be due to, or associated with, some form of vascular disturbance affecting the motor tract in the brain or spinal cord.

The *symptomatology* of chorea, as a rule, affords no difficulty. The movements of the hands, face, and legs, and, above all, the irregular, coarse movements of the tongue, cannot be mistaken for anything else. The general restlessness, the awkwardness in the execution of most delicate movements, the thickness of speech, the "facies" of chorea (the exaggerated movements of face-muscles on protrusion of the tongue) will help to corroborate the diagnosis.

**Post-hemiplegic Chorea.**—However distinct these diagnostic symptoms may be, *post-hemiplegic chorea* is sometimes mistaken for the ordinary functional chorea. In a former article by Sachs and Peterson[6] it was shown that choreic movements persisted in 6 out of 105 cases of infantile hemiplegia. I have been consulted a number of times in cases of persistent chorea which on closer examination proved to be cases of infantile cerebral palsy with chorea. Under these conditions the choreic movements are the result of organic changes in the brain, and cannot be affected by the ordinary or by any form of treatment; but the physician can at least be expected to determine whether a cerebral palsy has preceded the onset of the chorea.

The *prognosis* of ordinary chorea is good. Sinkler is responsible for the statement that in Philadelphia in seventy-four years there have been but 64 deaths from chorea. I have seen but a single case in which the chorea was the direct cause of death, the incessant movements and the loss of sleep having produced a condition of exhaustion from which the child of six years could not rally. We must be extremely guarded, however, in promising a complete cure within a definite period of time.

[1] *Lancet*, 1885.
[2] *Rev. Clin. di Bologna*, Dec., 1874.
[3] *Lancet*, 1889.
[4] *Verhandlungen des Congr. f. innere Med.*, 1888.
[5] *Arch. f. Psych.*, Bd. 23, p. 167.
[6] *Journal of Nervous and Mental Diseases*, May, 1890.

It is best to give ourselves ample latitude, for even a mild attack is apt to last for a number of weeks or months, and the severer attacks may last a year and more.

**Treatment.**—If we regard chorea as a form of exhaustion of the central nervous system, *rest* is the first essential of treatment. No other therapeutic measure, and surely no medicinal agent, can at all be compared with it in the treatment of chorea. I have been in the habit of saying in lectures before students that rest and good food are sufficient to cure the large majority of cases of chorea.

In the severer cases rest should mean rest in bed ; in the milder cases, or in the stage of convalescence, the patient may be kept in bed half a day, or may be allowed to be up for a few hours morning and afternoon. It is not always easy to have this plan carried out. Mothers, as a rule, protest that the child is so restless that it cannot be kept in bed—that it seems to grow more "nervous" the longer it is kept in bed, and so on. Whenever I have yielded to such protestations I have had cause to regret it. Put every child, and surely every adult, with chorea in bed for at least a few weeks ; let a nurse or some intelligent relative sit by the patient's bed, if necessary, to control the restlessness or to curb the desire to leave the bed ; let the patient have such pastime in bed as will vary the monotony of absolute rest, and will not at the same time increase the choreic movements. Children, in particular, may be allowed to play with cards, look at pictures, and the like, but writing, drawing, or needlework should be prohibited. As the patient grows better mild exercise may be judiciously intermingled with rest ; but every form of violent exercise, such as riding, dancing, bicycling, and rowing, should not be indulged in for months after the attack of chorea has passed. This rest-plan may have to be modified a little in those cases which occur during the summer months, but even in such cases, while the patient should be given all the fresh air possible, a maximum of rest should be aimed at.

These principles should be applied, as far as possible, even in dispensary practice. I have made the rule at my clinics that patients with chorea should be kept at home as much as possible ; the parent or relative reports to us, but the patient himself is brought to us at long intervals only.

I need scarcely insist on the necessity of keeping a child with chorea from school. This is important, not only on the patient's account, but also because the movements of a choreic child are apt to be imitated by other children. "Epidemics" of chorea, probably of imitative chorea, are not unknown.

Choreic patients need a highly nutritious and easily digestible diet. If the patients, young or old, can take milk, an exclusive milk diet while the patient is in bed is to be preferred to every other form of

nutriment. If milk is not well tolerated, koumyss, matzoon, or the like may be substituted for it; and in other cases a nutritious mixed diet consisting of milk, meat, fish, eggs, and oysters may be given. An excess of farinaceous food or of sweets should be avoided.

The effect of the rest-plan may be intensified by the judicious application of hydriatic measures. According to the condition of the patient, a stimulating cool sponging or a quieting warm bath may be employed; but the principles underlying all hydro-therapeutic procedures have been so well stated by Dr. S. Baruch in Volume I. of this work that the reader is referred to that article for further details.

The use of electricity has been urged by Erb, Sinkler, and others. I have seen good results follow the use of moderate labile galvanic currents (not exceeding 15 milliampères) applied to the spine. It is best in every case to abstain from applications of the current to the head. Any possible good that the current might do is outweighed by the effects of shock which would be apt to occur unless the current were applied by those whose batteries are fitted with rheostat, milliampèremeter, and a reliable dial-plate. If applied to the head, the current should not exceed 3 milliampères in strength.

In a few selected cases—particularly in stout, anæmic persons—massage may be employed to further the general nutrition of the body.

Nebel[1] of Frankfort-on-the-Main has written an able article on the mechanical treatment of chorea. Those of us who have become familiar with the excellent system of Dr. Zander will not be surprised that the absolutely regular movements of any or all muscles, and the regularity of respiratory movements, carried out by Zander's apparatus lead the patient better to co-ordinate the action of his various muscles; but I do not feel that the rest-plan of the first few weeks should be disturbed on any account. Furthermore, we have but few Zander institutes in this country as yet: this special plan of treatment will be applicable, therefore, in only a limited number of cases.

Whatever praise we may bestow upon any or all of the preceding measures, we shall in most cases be compelled to resort to medicinal treatment as well.

Among drugs, arsenic is still the chief remedy in the treatment of chorea. It is given best in the form of Fowler's solution, the dose varying from 4 to 25 minims three times daily. I have given the maximum dose as above in deference to Dr. Seguin's views, who in an excellent paper[2] on the treatment of functional neuroses states that arsenic often fails because it is not administered in sufficient quan-

[1] *Contributions to Mechanico-therapeutics and Orthopædics*, edited by L. Wischnewetzky, M. D., vol. i. No. 3, New York, 1891.

[2] *New York Med. Journal*, March 21–May 31, 1890.

tities. Seguin would even give 27 drops after meals in most cases. I am of the opinion that arsenic so often fails because it is not combined with the rest-treatment. Seguin places arsenic first and rest second in the order of efficiency as antichoreic measures. To my thinking, this order should be reversed. I have found Seguin's plan of giving the Fowler's solution in a large quantity of water after meals in divided drinks a good one. But, in whatever way you may choose to give arsenic, some patients will display great intolerance: in these cases adhere to small doses, increase gradually, and, if necessary, stop the drug for a few days, and then begin with the dose at which you stopped. If the patient's general condition suffers in consequence of the arsenic, do not be too persistent; stop the arsenic and use some substitute.

In those cases in which there is considerable restlessness or slight insomnia Fowler's solution may be given with the elixir of the bromide of sodium or potassium: in some cases I have found it a better plan to give the night dose only in this mixture, while the morning and noon doses were given in the ordinary way in plain or alkaline water.

The only substitutes for arsenic which are of decided value are the tincture of cimicifuga and conium: the former is my first choice if arsenic cannot be given. In the case of young and delicate children I begin with a dose of 15 or 20 minims after meals and gradually increase up to 60 minims; in adults it is safe and proper to begin with 20 drops and increase the dose up to 60 or 70 minims. Conium is best administered in the form of the fluid extract in doses of 2 to 5 minims three times daily. The sedative action of conium makes the drug a very desirable one in cases of restlessness with insomnia.

Neither arsenic, cimicifuga, nor conium should be continued too long a time. As soon as a marked improvement has been achieved these drugs can be set aside and the patient placed on tonics. In my experience iron with small doses of quinine will act best, and if I wish to give these and yet continue arsenic, I have the following pills or capsules administered three times a day:

| | |
|---|---|
| ℞. Ferri redact., | gr. j–iij; |
| Quininæ, | gr. ij–v; |
| Acid. arsenios., | gr. $\frac{1}{50}$–$\frac{1}{30}$. |

If iron alone meets the exigencies of the case, I favor the use of Blaud's pills (if the patient can swallow them), tincture of the chloride of iron in 15 to 30-drop doses, or else one of the many preparations now in the market of the peptonate of iron.

Anæmia and heart weakness or irregularities of cardiac action are

conditions which have to be met in the treatment of many cases of chorea. Here the use of iron or of digitalis (infusion or fluid extract) or of tincture of strophanthus will best meet the requirements of the case. If necessary, the heart's action can be further stimulated by the exercises in a Swedish institute or by the use of cold-water applications (beating with a cold wet towel) to the region of the heart.

Innumerable other drugs have been recommended by different authors: the oxide and sulphate of zinc have enjoyed popularity for a time. Physostigmine ($\frac{1}{100}$ to $\frac{1}{60}$ grain) was in vogue for a short period. Weir Mitchell has a good word to say for the salicylates, and several French authors have advised the use of antipyrine. I have given each drug a fair trial, and I have found no reason for abandoning the use of arsenic or cimicifuga. I object most strongly, however, to the use of antipyrine. Its depressing effect upon the heart should make one extremely careful in the use of it in all cases of chorea, but particularly in those complicated by heart disease.

The milder cases of chorea call for little treatment, medicinal or otherwise, and they are apt to get well whatever treatment is pursued or if no treatment at all be given; but in the severer cases there is danger from exhaustion and the movements must cease. In such cases there is no drug that can compare with hyoscyamus or hydrobromate of hyoscine ($\frac{1}{100}$ to $\frac{1}{60}$ grain): it should be given either in a large quantity of water or else hypodermically. It is as efficient in these cases of severe chorea as it is in acute mania. The drug should be pushed until the physiological effects (dryness of mouth and dilatation of pupils) are observed. As a rule, the dose of $\frac{1}{100}$ grain several times daily will be sufficient.

Lastly, the insomnia, often the most annoying symptom in the earlier stages of chorea, demands active interference. A prolonged lukewarm bath at night is often sufficient; if not, some hypnotic must be administered, and I would advise rectal injections of either chloral (10 to 30 grains), chloralamid (10 to 30 grains), or sulphonal (also in 10- to 30-grain doses, according to the age of the patient). Chloralamid and sulphonal are best given in the earlier part of the evening; the rectal injections may be administered at the time it is desired that the patient should fall asleep. As soon, however, as it is possible, the hypnotics should be discontinued.

The writer finds that he has spoken of a variety of drugs in the treatment of chorea, but he wishes once more to emphasize the point that *chorea is treated best not by drugs, but by rest and nutritious food.*

# EPILEPSY AND TETANUS.

By J. CHALMERS DaCOSTA, M. D.

## EPILEPSY.

The pathology of epilepsy as taught to-day is a high probability, but, unfortunately, not an established certainty, and our remedial measures are suggested by experience rather than deduced from a scientific knowledge of any recognized fixed and measured morbid process. We know beyond question that in this malady the cells of the cerebral cortex are in a condition of high instability, and prone to pass from normal functional relations into spasmodic activity, evinced by explosive discharges of nerve-force. Whether this condition be due to molecular alterations in nerve-structure, or to structural lesion still unfound, but possible of recognition, we do not know. Some recent investigations of Féré[1] render it not improbable that the long-sought-for lesion is a sclerosis of the cortex due to hyperplasia of neuroglia, this cortical sclerosis having followed a primary lesion the traces of which have passed away. It would seem likely, however, that this cortical sclerosis is expressive of atrophy of the cells of the organ brought about by faulty nutrition, hereditary or acquired; that is to say, the lesion being rather expressive of nutritive failure than causative. Hughlings Jackson is of the opinion that plugging of the small arteries is the primary cause of epilepsy, while Sachs[2] ably advocates the view of a primary lesion with a secondary sclerosis, the sclerosis inducing the epilepsy. Some hold that the convulsions are due to vaso-motor spasm arising from abnormal irritability of the medulla; and, in fact, there are views without number, not one of which is yet actually and irrefutably proved.

We should, however, always remember that, whatever the lesion be, epilepsy is only a symptom—it may be the only symptom, as in essential epilepsy; it may be one of many symptoms, as in gross organic cerebral disease; but in any case it is a symptom, and not a disease.

As far back as history shows and tradition indicates epilepsy has afflicted man. Methods without number, drugs beyond estimate, have

[1] *Les Épilepsies et les Épileptiques*, Paris, 1890.

[2] "The Surgical Treatment of Epilepsy," *N. Y. Med. Journal*, Feb. 20, 1892.

been employed for its cure. Castration and sexual intercourse, exorcism and trephining, excision of the cervical ganglia of the sympathetic and ligation of the vertebral arteries, circumcision and ocular tenotomy, the removal of the ovaries and the adjustment of glasses, have all been tried and all been praised by notable or celebrated men. From the wearing of amulets to salivation, from charms to bromism, from divination to dogs' dung, from the wildest absurdities of judicial astrology to the most scientific methods of modern surgery, there are few plans which have not had believers and few substances by which a cure has not been sought. Yet epilepsy is still with us, and with us to a fearful degree, 2 persons out of every 1000 having it,[1] and many more being predisposed and in danger of it. No specific has ever been found, and, though occasionally curable,[2] in the great majority of cases all we can hope to do is to mitigate its severity and retard its course. In view of this fact, the great importance of preventing epilepsy becomes apparent, and to prevent it in one group of persons we must be able to recognize a tendency before it eventuates in a habit, and in another realize the enormous importance of certain traumatisms as a cause. The first group of cases belongs to the physician, the second to the surgeon.

**Prevention in those Predisposed by Heredity.**—This group includes all of those unfortunate persons who are victims of the spasmodic neurosis—a name introduced by Maudsley. People of this class labor under nervous instability and present certain well-marked indications, mental, motor, and expressional. Ideas and muscular actions, torn from control and co-ordinate function, take on spasmodic activity out of the domain of normal functional relation: these activities, tending to repetition and gaining force at every *new* explosion, eventually form a most tenacious morbid habit.

A child of neurotic heredity is especially prone to motor nerve-storms, and the first indication of an epileptic tendency is often an attack of infantile convulsions. It is not assumed that such an outbreak invariably precedes epilepsy, but it is unquestionably the fact that a large majority of epileptics of whom an accurate history is obtainable have had these convulsions in infancy. Such attacks in childhood exhibit a morbid sensibility to peripheral irritations, and should be esteemed a peremptory indication for years of watchful care, our aim being to prevent the occurrence of other convulsive seizures and the formation of a habit of convulsion or epilepsy.

The convulsion of infancy is readily arrested by putting the patient in a hot mustard bath and applying an ice-bag or cold cloths to the head; if the gums are swollen we should lance them; and as soon as

[1] *Familiar Forms of Nervous Disease*, M. Allen Starr.

[2] Curable in from 5 to 7 per cent. of cases, it is held.

consciousness returns a dose of bromide of potassium is given by the stomach or chloral by enema, and moderate doses of calomel are ordered. The child is for some days kept quiet on a light diet, and a little bromide of potassium given daily for three or four weeks.

The physician should search for sources of irritation, and when found remove them. At this early age the usual sources will be found in gastro-intestinal disorder, phimosis, dentition, worms, or disease of the brain. Teething will indicate careful diet, exercise in the open air, a tonic, and lancing of the gums when called for. Gastro-intestinal disorder points to the need of appropriate alimentation and remedies. Worms require a vermifuge, and phimosis demands operation.

As the neurotic child grows older its mode of life is carefully planned to rule out as far as possible exciting causes of nervous storms and to modify as much as may be the morbid predispositions of its organism. The eyes are now to be studied by an ophthalmologist, and any existing error is to be corrected. Every attention is given to the prevention of bad sexual habits. The will-power is in these cases weak; the emotions are irregular, violent, and difficult to control; hence firm discipline will force the will to gain power by exercise. To spoil a neurotic child means the tyranny in future life of its entire organism by its morbid parts. Food is to be plain, nutritious, and digestible, containing a minimum of meat and a maximum of milk. Coffee, tea, and liquor are not to be used, and gluttony is an evil to be sedulously avoided. Good sleep is in the highest degree important, and the sleeping-room should be well ventilated. Any tendency to sleeplessness is at once corrected by a warm bath at bedtime, by a little milk and bread just before retiring, or, if these means fail, by the use of urethane, sulphonal, or the bromides. A weak nervous system must have plenty of time in which to do its repairing, and poor sleep will soon eventuate in manifest disorder. Exercise in the open air is insisted on: it improves nutrition, appetite, and digestion, favors sleep at night, and prevents constipation. The exercise is such as to cause moderate fatigue, but not exhaustion, and is to be insisted on. Constipation is to be prevented. Proper exercise is usually sufficient to do this, but if not order the patient to suck an orange before breakfast, to eat a few prunes daily, or to employ some other simple expedient. The habitual use of laxatives is not desirable, but if driven to them for a time we can use the syrup of figs, buckthorn, cascara sagrada, or the well-known combination of belladonna, nux vomica, physostigma, and aloin.

At any time evidences of anæmia indicate iron and arsenic, and the phosphates in these neurotic cases have a theoretical value. We commonly find present the cardiac condition known as neurotic heart, which calls for digitalis or strophanthus, followed by a course of strychnine.

The use of tobacco is, if possible, to be prevented. Poring for hours over books is interdicted, not that a person of such morbid tendencies should not study, but that he should not over-study. Study as a mental exercise is of infinite value, but study causing mental exhaustion is of infinite harm. The amount, subjects, and modes of study, the discipline and the rewards, should, however, be outlined by the skilled physician rather than by the trained schoolmaster. The former can formulate a system to suit a child; the latter will deform a child to fit a system. The amusements are to be such as do not unduly excite the passions and emotions.

The keystone of success in the management of a person with the spasmodic neurosis is the formation by him of a habit of calm self-control, which will weaken and displace the tendency to spasmodic mental and motor activities. He had better become a stoic than an epicurean. In most children the subjects of the epileptic predisposition the above plan of care and treatment, early begun and carefully persevered in, will prevent the occurrence of a special and fixed disease.

The foregoing suggestions, unfortunately, are capable of but limited application in the families of the poor and of the ignorant.

**Prevention of Post-traumatic Epilepsy.**—There is no question that epilepsy can follow traumatism, either quickly or after many months. The accident may have been severe or trivial, may be remembered or may have passed from the mind of the patient. Sachs,[1] in an admirable paper upon the treatment of epilepsy, says he not unfrequently finds that epilepsy has arisen "from a long-forgotten injury or accident—that it was in its earlier days associated with paralysis, the paralysis having left but the slightest traces, while the epilepsy has remained distinctly enough."

It seems highly probable that many cases of epilepsy might be prevented by proper care of every head injury. These injuries may be excessively grave, and yet for many hours present no obvious symptoms. In October, 1891, a man presented himself at Professor Brinton's clinic in the hospital of the Jefferson Medical College with what appeared to be an insignificant scalp wound. There was no pain, spasm, or palsy. The patient had not been a single moment unconscious, and had walked five blocks to the hospital. An incision of the scalp, however, disclosed a punctured fracture of the skull, and trephining brought to light extensive splintering and depression of the inner table, with laceration of the dura and tearing of the brain itself. It is very evident that if so severe an injury could exist for some hours without symptoms, less grave ones might never induce active symptoms, but could set up nutritive alterations which would long after produce epilepsy. It is important also to note that the above grave injury could not be

[1] N. Y. *Med. Journal*, Feb. 20, 1892.

detected until the scalp was extensively lifted; how impossible, then, to make out the condition in less severe accidents with unopened scalp! Dr. W. W. Keen[1] in any severe contusion of the head puts the patient to bed, opens the bowels, and keeps him on a light diet. If any symptoms arise to excite suspicion of intracranial trouble, he opens the scalp by a semicircular flap and inspects the bone. If a fracture is found, he trephines and opens the dura, or, even if no fracture exists and the symptoms are those of encephalitis, he trephines for exploration. In very severe contusions he at once incises the scalp, and if necessary does preventive trephining. Professor D. Hayes Agnew[2] in a recent paper has warmly advocated preventive trephining.

Trephining by modern methods is a safe operation. It is better to subject a patient of the nature whose injury there is question to an exploratory operation which may prevent grave disease, than to let him take his chances in life of epilepsy, insanity, or organic disease of the brain. Conservatism here is often disastrous, and the utmost safety is with the radical method.

The rule should be after a head injury to inspect the bone well, and when in doubt to trephine.

### Treatment of the Established Disease.

In every case of epilepsy we must seek for peripheral irritations, and remove them as possible exciting causes by medical or surgical means. Examine the eyes, nose, teeth, and throat, treating any disease which is found; allay gastric irritability; seek for parasites, intestinal or vaginal; maintain regularity in bowel movements; in fact, interrogate the entire organism in our search for irritations which could cause or aggravate epilepsy or intensify its convulsions by acting on a predisposed brain. After removing any possible cause we can divide the treatment of epilepsy into medical and surgical:

The medical treatment is subdivided into—

1. The treatment of the convulsive seizure;
2. The prevention of an individual paroxysm;
3. The care and treatment between the paroxysms;
4. The care and treatment after the convulsions have for some time ceased;
5. The treatment of complications.

**The Treatment of the Convulsion.**—In an ordinary epileptic fit little is required to be done. The head is slightly raised, the collar and waistband are loosened; during the clonic stage a soft stick is pushed between the teeth to prevent biting of the tongue, and mucus is from

[1] Wood's *Reference Handbook.*

[2] *University Medical Magazine*, 1891.

time to time wiped out of the mouth. During the post-convulsive sleep, if not too prolonged or profound, nothing need be done. It is claimed that by inhalation of ethyl bromide the attack can be cut short after the tonic stage, but this agent is unsafe.

**The Prevention of an Individual Convulsion.**—When there is a well-marked aura preceding a fit, it is unquestionably true that in a certain proportion of cases the attack may be aborted by applying a blister, burning an area with a match, or tying a string around the limb between the seat of origin of the aura and the body.

In some experiments upon the interruption of auras made by the author in the nervous wards of the Philadelphia Hospital the fact became apparent that this means of prevention was entirely uncertain; that it acted in some cases, but not in others, and even in the same case might once succeed and repeatedly fail. It was further developed that a sudden electric shock was especially apt to be successful, and almost as successful whether applied between the seat of sensation and the nerve-centres or at some distant portion of the body. The only possible explanation of these facts is found in the concentration of the nerve-centres upon the new impression, the electric irritation often succeeding in inhibiting the assumed irritation manifested by the aura. It is in this way that a powerful faradic current will arrest a hiccough if passed over the skin of the abdomen just as the spasm of the diaphragm is about to begin. The prevention of a fit by the arrest of an aura is not sufficiently common to admit of wide application, nor sufficiently certain to be relied on; hence other means are to be sought for.

That nitrite of amyl, first used in this disease by Dr. S. Weir Mitchell, will very frequently abort an epileptic fit is certain. It is taken by inhalation when a patient who has his attacks announced by an aura of considerable duration feels the seizure coming. Such a person should carry perls of amyl nitrite about with him, and when the aura begins break one in his handkerchief and take several deep inhalations. Even in the rapid onset of an epileptic seizure, if this drug be administered as the deadly pallor appears in the face, it not infrequently will substitute redness for pallor and prevent a convulsion. The mode of action of this drug when so employed is in dispute. Dr. Bartholow and others hold that the inauguration of an epileptic paroxysm is due to sudden anæmia of the brain, and that amyl nitrite antagonizes this, or, in Gowers' words, "floods the brain with arterial blood." Professor Hare is of the opinion that this drug prevents an attack in the same manner as some artificial peripheral irritation may, by inflicting a shock on the centres and "diverting" them from their intended discharge. Nitro-glycerin, if taken by the stomach a short time before an attack is expected or if given hypodermically at the onset of an aura, may abort the convulsion.

If fits occur with such regularity as to enable us to know with some certainty about when to expect one, it is good practice to administer a considerable dose of an alkaline bromide about four hours before the time.

**Treatment between the Paroxysms.**—This aims primarily to cure the disease, which it will rarely do, and, failing in this, to decrease the frequency of the convulsions, in which attempt it will commonly succeed. It divides itself into hygienic and medicinal.

*Hygienic Care.*—An epileptic should never overload his stomach, and should take plain, nourishing, fat-forming foods, especially milk. Meat is used in small quantities, but is never allowed to constitute the bulk of his dietary. People of neurotic temperament are almost sure to prefer meat. The proper conversion of the waste nitrogenous products belongs to the liver. The liver in these people is apt to be insufficient and to form uric acid instead of urea, and hence, if left to follow their own bent, they are particularly prone to develop lithiasis.[1]

Tobacco is prohibited; alcohol is contraindicated. Bad sexual habits are sought for and forbidden. Sexual intercourse, fortunately, is rarely desired after a course of the bromides, but it should be prevented if possible. Marriage is absolutely forbidden. Such a marriage would probably prove unfruitful, but procreation would mean insane, epileptic, or neurotic descendants. The patient's life should be calm, regular, uneventful. His occupation should be one not requiring particular care or anxiety, not possessing elements of excitement, not one requiring him to climb into dangerous positions or to assume responsibilities affecting the safety of others. Particular care is taken of the bowels, fruit, exercise, etc. being employed to prevent constipation, and drugs only used when simple means fail. Open-air exercise, regular and prolonged, is invaluable. The stomach is carefully guarded, and dyspepsia at once treated by careful alimentation and suitable drugs.

*Medicinal Treatment.*—The Bromides.—The remedies which possess in epilepsy the most widespread popularity are the alkaline bromides, alone or combined.[2] This popularity is deserved, and the use of these remedies unquestionably affords the best possible chance of curing this malady or of retarding its progress. Hughes Bennett studied 100 cases treated by the bromide plan, and of these 60 were most materially benefited. The mode of giving the bromides depends on the nature of the case. If fits occur with regularity, a massive dose is

[1] See the views of R. Milner Fothergill in the *Town-Dweller*.

[2] The extent to which their use extends is shown by the statement of the *Lancet* that the National Hospital for the Paralyzed and Epileptic employs every year one ton and a quarter of the alkaline bromides.

given from three to six hours before an expected convulsion, and small doses given in the intervals. When attacks occur in the morning, a large dose is given at night, some light food having previously been taken. The rule in the use of these salts should be *not* to give them on an empty stomach. The bromides are wanted for constitutional effect, and not for local action, and so are taken after meals. If taken when the stomach is empty, they are prone to disorder it seriously. Allan McLane Hamilton, however, does not hesitate to give them at night on an empty stomach, and Hughes Bennett regularly employs them when the stomach contains no food.

The amount given varies with the age and susceptibility of the patient. Females require less than males; children less than adults (though children bear relatively large doses well); cardiac and organic cerebral disease, according to Seguin, increases the susceptibility to bromides.

Gowers's method of administration is to give every second day, immediately after breakfast, 2 drachms of bromide of potassium, then 3 drachms every third day, 4 drachms every fourth day, and so on until drowsiness is manifest. When this point is reached the dose is repeated three or four times, and then by degrees reduced. This course requires from six weeks to two months, and the dose of 1 ounce is rarely exceeded. Hare's plan is to start with 10 grains of bromide of potassium three times a day, and every day to add 10 grains until the patient is saturated to the required degree. In chronic epilepsy he pushes the drug for one week in rapidly-increasing doses, but during the following week gives just sufficient to maintain the general effect, so giving the stomach a moderate rest at regular intervals.

Voison's plan, followed by Bartholow and many others, is to give the bromides in constantly increasing doses until anæsthesia of the fauces is noted, and then to diminish the dose. We know this point is attained when a touch with a feather to the back of the tongue, fauces, or pharyngeal walls produces no reflex movement and no nausea. To reach this point in an adult usually requires three weeks or more.

The elimination of the bromides is slow. Hare[1] states that Rabuteau found bromide of potassium in the urine one month after any had been taken. With this slow capacity for excretion three daily doses must cause a systemic accumulation, inducing the condition known as bromism—a state of slow progressive poisoning, and which in some susceptible subjects arises from small quantities of the drug. In bromism the complexion is muddy or bronzed, the skin, which is cold, and moist, is covered with acne, faucial anæsthesia is complete, the heart is weak and rapid, there is great loss of memory, with indiges-

[1] *Epilepsy, its Pathology and Treatment,* Hobart A. Hare, p. 189.

tion hesitating speech, dilated pupils, apathy, fœtid breath, loss of emotion-control and sexual power, mental confusion, somnolence or great drowsiness, uncertain gait and muscular tremor, and bronchitis is apt to exist. If the use of bromides be still persisted in, the patient will develop pronounced ataxia, pustular eruptions or destructive skin lesions, as hydroa, and profound dementia. That the bromides can induce a condition analogous to dementia has been amply demonstrated by Dr. John B. Chapin of the Pennsylvania Hospital for the Insane. The ignorant and excessive use of these drugs is without doubt responsible for a considerable number of the hopeless epileptic dements which crowd our asylums. We should endeavor to prevent the occurrence of this condition of poisoning by diminishing our doses when distinct signs of it are manifest, or by stopping them entirely. The use of strong coffee at meals antagonizes the development of bromism (Echeverria).[1] Three drops of Fowler's solution of arsenic, given with each dose of the salt, unquestionably hinders the development of bromism, and it should be routine treatment so to combine them. Iron too seems to have a similar power, and can be given as bromide of iron. When bromism has become established stop at once the use of the causative, give digitalis as a heart tonic and diuretic, administer stimulants, and feed at frequent intervals with concentrated foods, and when the symptoms have abated give a course of tonics, as iron, nux vomica, and quinine, in small doses.

The form in which to use bromine is to a considerable extent a matter of choice. Bromide of potassium, of sodium, of ammonium, of lithium, all find advocates. The potassium salt is most commonly used; the sodium salt is less toxic, and hence less apt to induce bromism, is more hypnotic, and less irritant to the stomach, than the bromide of potassium. The bromide of lithium, it is claimed by Mitchell, is of peculiar benefit in obstinate cases. The bromide of ammonium when used alone is excessively irritant to the stomach. Eilenmeyer in 1884 suggested the use of a mixture of the bromides, in the proportion of 2 parts each of the potassium and sodium salts to 1 part of the ammonium salt. An enormous amount of clinical experience has shown the great value of this mixture, and it should be preferred to either of its constituents alone. Why it is of greater value than any one of its constituent salts is not known, but the fact is amply proven.

The beneficial effect of the bromides in epilepsy seems to be due to their influence on the cerebral cortex, by which the excitability of the cells of the motor areas is very greatly diminished. Albertoni demonstrated that when dogs are under the influence of bromide of potassium it is practically impossible to produce convulsions by any degree

[1] Echeverria *on Epilepsy.*

of cortical irritation. Dr. Hare[1] shows further that the bromides are of use in reflex epilepsies, not only by their action on the cerebral centre, but also on the sensory paths of the cord, bringing about a loss of reflex irritability.

Dr. Hughlings Jackson believes that the bromides act by "substitution nutrition," causing the formation of more stable nervous matter.

These alkaline bromides are of most benefit in cases of marked convulsion, and of least benefit in epileptic vertigo, or in petit mal with a few spasmodic movements. They are of more value in diurnal epilepsy than in nocturnal. The great power of bromide of potassium over convulsions is shown by the fact that it may even arrest for a considerable time the violent convulsions of brain tumor.

That some few cases of epilepsy are permanently cured by these drugs is undoubted, but in the great majority of patients it alleviates rather than cures, and convulsions are apt to return when the administration of the drug ceases.

Bromine is give in many other forms than with the alkalies by different practitioners. The bromide of arsenic is recommended by Clemens of Frankfort for the epilepsy of idiots. Bourneville, Dange, and Goubert have tried the bromide of gold, and believe that it does some good. It is given in aqueous solution in doses of $\frac{1}{4}$ grain, and must be kept in the dark. M. Constantine Paul has seen bromide of strontium succeed after bromide of potassium had failed. He gave 90 grains daily for two months. Bromal hydrate has been used. It acts something like chloral, but is more poisonous. Bromine of calcium is less depressant than bromide of potassium. It may be given in doses of from 15 to 30 grains, in aqueous solution. Hydrobromic acid in doses of $\frac{1}{2}$ to 1 ounce in a glass of sweetened water has been given, but it is excessively disturbing to the stomach. Mitchell has used with benefit the bromate of potassium in 5- to 10-grain doses, but it possesses no advantages, and its use is not free from danger. Dr. Hare by a series of experiments determined that bromide of nickel is in action practically identical with bromide of potassium. It has certainly proved curative in some few cases where the potassium salt failed.

The bromide of zinc has been used in doses of from 2 to 8 grains in syrup. In larger doses it is emetic. Hammond claims that it is not apt to cause bromism. Monobromate of camphor is of value in some cases by increasing the inhibiting control of reflex movements. The initial dose of the monobromate is 5 grains three times a day, increased carefully to 10 grains, 15 grains, or even 20 grains. In cases with marked sexual excitement it is of benefit.

[1] *Epilepsy, its Pathology and Treatment.*

The bromide of iron is a valuable addition to a mixture of the alkaline bromides, about ½ grain being taken at a dose. It antagonizes anæmia and the tendency to bromism.

There is no question, however, that if we want to give bromine a mixture of the salts of potassium, sodium, and ammonium is the best, which mixture should contain arsenic and be given after meals in a large quantity of ordinary water or Vichy water or water containing the aromatic spirit of ammonia. During the administration of these drugs we should always remember that they may do harm instead of good, causing bromism, great anæmia, dementia, and even death.

Borax.—This remedy has been reintroduced by Folsom,[1] and is used in some cases by Gowers. Mairet[2] gives the following results in 31 cases: 5 were not benefited; in 4 the drug was stopped because of toxic symptoms; in 19 there was improvement, marked in some cases; in 3 there was complete cessation of fits during several months. His conclusion is that borax is useful when the bromides fail or are badly borne, and is of especial value in epilepsy from gross organic brain disease.

Dr. Dijoud[3] used it in 25 cases; all but 6 were relieved, and 1 was apparently cured in from one to seven months.

This drug is of especial benefit in nocturnal epilepsy. We start with small doses, 10 grains, three times a day, and push up to 80 or 90 grains daily. It may produce eczema,[4] psoriasis, sore lips and mouth, nausea, and vomiting. A little cocaine given twenty or thirty minutes before the borax will prevent the vomiting.

Borax is given in syrup, water, and a little glycerin. Boric acid may be used instead of borax in doses of from 5 to 20 grains.

Osmic Acid.—Wildermuth tried osmium both as the acid and as osmate of potassium. He gave doses of .002 gm. ($\frac{1}{32}$ grain) of the acid in water or pill at a dose, or .004 gm. ($\frac{1}{16}$ grain) of potassium osmate. It seems to benefit some chronic cases.

Picrotoxin.—Picrotoxin is given in doses of $\frac{1}{120}$ to $\frac{1}{60}$ grain in pill form. Planat suggests a tincture made by treating 1 part of cocculus indicus berries with 4 parts of alcohol. He begins with 1 drop morning and evening, and adds 1 drop to each dose daily, until 60 or 70 drops a day are taken by an adult.

Lauder Brunton says that picrotoxin is without value in epilepsy, and Hare considers it as probably useless. Seppeli's experiments which show that picrotoxin increases the irritability of the motor areas, would seem to contraindicate its use.

[1] *Boston Med. and Surg. Journ.*, Feb. 18, 1886.
[2] Quoted in *Lancet*, pp. 1055 and 1056, Nov. 7, 1891.
[3] Quoted in *Lancet*, p. 135, July 19, 1891.
[4] Féré.

CURARE.—This is a most poisonous drug, and whereas Kunz has made a claim for it in epilepsy, the general verdict is against its use. Bourneville believes it to be a useless drug in this disease. Kunz used it hypodermically in doses of .03 gms. ($\frac{1}{2}$ grain).

APOMORPHINE.—Apomorphine, given hypodermically, is one of the multitude of drugs preferred by one person and not favored by the great majority.

DIGITALIS.—This drug is unquestionably of considerable value, especially in *petit mal* and nocturnal epilepsy. Its value in the latter state would seem to depend on its power to secure sleep when insomnia exists through want of vascular tone. Its mode of action in epilepsy, besides a tonic influence upon the neurotic heart, may possibly be by stimulating the inhibitory reflex centre, as we know very large doses have this effect. Digitalis is often a valuable addition to the bromides.

BELLADONNA has long been used in epilepsy. Given alone, it is rarely of much value in cases of marked convulsions, but it does do good in *petit mal* and nocturnal epilepsies.

Trousseau was fond of this drug in epilepsy, and insists on giving it for at least a year in increasing doses, and if improvement is then manifested it should be given for several years longer. The best results of belladonna are seen in cases with very weak and irritable hearts. It is best given combined with the bromides.

CANNABIS INDICA has been used with success. Sinkler attained excellent results with it. Hare says it resembles the bromides in its action. It is given as a solid extract (doses of $\frac{1}{2}$ grain) or a fluid extract (doses of 15 to 20 minims). It is a safe remedy worthy of further investigation.

GELSEMIUM is of no value alone, though Hare approves of it with cannabis indica.

NITRO-GLYCERIN, in doses of 1 drop of the centesimal solution several times daily, is of unquestionable value in *petit mal.*

NITRITE OF AMYL may be given internally, Hammond claims, with benefit. He adds 15 minims of nitrite of amyl to 90 minims of alcohol, and gives from 5 to 30 drops a day.

NITRITE OF SODIUM may be given in *petit mal* in doses of 1 grain three times daily.

CHLORAL is of great value in epilepsy characterized by very violent convulsive seizures, by insomnia, or by maniacal excitement. This drug does not affect the motor nerves; hence the paralytic phenomena which result from large doses are due to its centric effects. Chloral does good by exercising a sedative influence on the motor area of the cortex and the motor path of the cord, by securing sleep and allaying mental excitement. It can be given alone or in combination with one of

the bromides. The author has used the above-mentioned combination, on a large scale, in the insane wards of the Philadelphia Hospital. It will control convulsions to a great extent, but if given during the day it creates a somnolent, inattentive, torpid state, which seems in a short time to increase mental weakness. If chloral is given during the day, it should not be employed every day. Its greatest value is manifest when given in the evening. An excellent plan for the treatment of epilepsy consists in the use of the mixed bromides during the day and of chloral in the evening. Chloral, it is needless to say, is dangerous in heart disease.

SULPHONAL.—Recently Dr. S. Weir Mitchell has used this drug in epilepsy with the result of controlling the attacks. Unfortunately, however, in order to control attacks we must induce an habitually somnolent condition on the part of the patient.

ACETANILID.—This drug is of unquestionable power, especially in chronic conditions and where the bromides have failed. Germain Sée and Hare have seen great benefit arise from its use, and the latter recommends that 8 grains mixed with sugar be dropped on the tongue three times daily. Leidy concluded, from a study of 26 cases, that acetanilid is of especial benefit in *petit mal*.[1] Very often acetanilid will fail even in large doses, and large doses are not desirable, because of the great depression apt to ensue upon their use. Galin declares that the drug is of no value in epilepsy, and that some patients while taking it become worse.

ANTIPYRINE.—This remedy has been used in epilepsy for about five years. Lemoine found it of value in certain reflex epilepsies, and of especial use in epileptics with migraine. Antipyrine alone is also of value in epileptic mania. An enlarged study of the use of antipyrine indicates that, when given alone, it benefits some very few cases markedly, but that the vast majority are unimproved. In combination, however, with the bromide of ammonium, as recommended by Professor H. C. Wood in 1888, it increases greatly in value, and this mixture affords at the present time the best routine treatment of epilepsy.

Dr. Chas. S. Potts[2] reports 43 cases of idiopathic epilepsy treated with this mixture. In not one case was bromism or any other unpleasant symptom produced; in every case marked improvement was noted, and in some amelioration of the symptoms occurred when all other ordinary methods had previously proved futile. In a further communication, read before the Philadelphia Neurological Society in Jan., 1892, Dr. Potts adds 30 more cases to this list: 19 were very greatly

[1] *N. Y. Med. Journ.*, vol. i., 1888.

[2] *University Medical Magazine*, Oct., 1890.

benefited, 8 did not return to the clinic, 2 received no relief, and 1 reported more fits than usual.

Dr. Chas. M. Hay[1] tried the combination of antipyrine and bromide of ammonium upon hopeless epileptic lunatics in the Morris Plains Asylum. In the great majority of his cases it diminished the number of convulsions, in some instances in cases where the bromides alone had utterly failed, and it produced no evidences of bromism.

The above citations would indicate that the mixture of antipyrine and bromide of ammonium is of exceptional value in epilepsy.

PHENACETIN.—This drug also, it is asserted, is of value in epilepsy.

IODIDE OF POTASSIUM.—This agent is of no utility in ordinary epilepsy, but in syphilitic epilepsy it is the only drug which holds out hopes of cure. In this condition it is given in gradually increasing doses, well diluted, after meals, beginning with 30 or 40 grains daily, and pushing it up into the hundreds. We can, if it be desirable, give bromides at the same time, and should, in every instance, employ mercurial inunctions.

NITRATE OF SILVER is an old remedy, apparently of entire uselessness except in cases associated with disorder of the stomach, when, indirectly, it may for a time improve the epilepsy by allaying stomachic irritation. We can try this drug if we wish when all other remedies fail, but it offers no prospect of cure. If its use be prolonged, staining may occur. The oxide is less likely to induce this than the nitrate.

THE SALTS OF ZINC have been largely used, and apparently with some benefit. The oxide is given in doses of about 5 grains three times a day. It is apt to disorder the stomach. The citrate is less irritant, and Herpin prefers the lactate. The bromide of zinc has been alluded to.

STRYCHNINE.—This drug was suggested by Tynhel in epilepsy. Theoretically, strychnine would seem to be positively contraindicated, because of its power to increase the reflex excitability of the cord and the irritability of the cerebral cortex. Practical experience, however, shows that in some cases it is of service. It is said by Bartholow to be indicated in the epilepsy of young and anæmic subjects. It is said to be of more service in *petit mal* than in *grand mal*.

ERGOT alone or in combination with the bromides is used to antagonize cerebral congestion.

COD-LIVER OIL.—The chief value of cod oil is as a nutritive agent, and in many cases, no matter what drugs patients may be taking, we should use it. Anstie claimed to have cured 7 patients out of 20 by oil alone.

[1] *Medical Age*, July 25, 1891.

Iron.—The bromide has been spoken of. Iron exercises no influence on the disease, but the claim that it makes it worse lacks confirmation. Its use seems to prevent bromism.

Hydrate of Amylene has been used by Dunn with apparent benefit.

Among remedies which some recommend, but which do not commend themselves to the judgment of the profession, are—Calabar bean, bryonia, electricity, conium, copper, musk, lobelia, ignatia, paraldehyde, phosphorus, santonine, sumbul, opium, and quinine. Dr. Hare holds that quinine and salicylic acid are to be avoided.

**Surgical Treatment,**—This has long been employed, consisting either of trephining the skull or cutting out cicatrices or erasing areas of peripheral irritation.

In considering surgical treatment we can divide our cases into 1, traumatic, and 2, non-traumatic. Professor Keen divides the first class into 1, where evidence of injury exists over a recognized centre; 2, where evidence of injury exists over the latent area of the brain. In cases where the scar is tender, the seat of morbid sensations, or if an aura starts from the scar, it will be wise to remove the scar before trephining if no depression of the skull or injury of the bone is manifest on lifting the scalp. Dr. Keen emphatically advocates operation when the injury is over a known centre and the spasms affect only the muscular group of that centre. In these cases the skull is trephined and the centre removed. He inclines to the opinion that we should operate in traumatism over latent brain areas. It is always wise to remove, before trephining, any other manifest source of irritation, as in the case reported by Briggs in which a depressed fracture of the skull existed, and also necrosis of the tibia, the cure of the necrosis stopped the epileptic attacks. If excision of the scar fails and other peripheral irritations are removed, or if depression of the bone exists, or if the evolution of the fits points to a local lesion, the skull is trephined. Dr. Keen says that a cyst may be found, eburnation of bone from osteitis, a dural scar, or a brain scar. Depressed bone is removed, and a scar is taken away. In every case the dura should be opened. When epilepsy follows injury in spite of primary trephining having been done, we should open the flap, round the bony edges by means of the rongeur forceps, and cut out the scar.

These operations in many cases seem to be curative, but a great uncertainty affects our conclusions, because of the curious fact that any operation seems to have a tendency to stop the fits for a time. Dr. J. Wm. White,[1] in a paper of great interest and ability, mentions 90 cases of trephining in which nothing abnormal was found, and yet great

[1] "The Supposed Curative Effect of Operations, per se," *Annals of Surgery*, August and Sept., 1891.

relief followed the operation, and in two instances apparent cure. Dr. White then goes on to mention instances of benefit or apparent cure following a tracheotomy, an accident by which one testicle was crushed, ligation of the carotids, incision of the scalp, keeping the wound open, etc. These procedures, probably interrupting the regular movement of the epileptic habit by means of nervous shock, render difficult a just estimate of the value of special operations. In most instances, however, though fits cease for a time, they again begin, and progress with increasing frequency to the old standard, whereas in certain of the special brain operations, though the disease often becomes again manifest, the attacks will be much more amenable to medical control, and will rarely reach in number the high level of the previous condition. At least five years should elapse without a convulsion before we feel well assured that we have achieved a cure.[1]

In non-traumatic epilepsy the fits are to be carefully studied by a competent observer. Keen insists on this. If the convulsions are of the Jacksonian type, the explosive centre is to be excised. This is a comparatively safe procedure—is occasionally followed by apparent recovery, and often by a permanent amelioration of the violence and frequency of the attacks. Keen, Macewen, and Horsley, after a large experience, are satisfied that this procedure is proper.

This procedure has been objected to on the ground that it causes paralysis, but the paralysis is rarely permanent, except, possibly, of the finer movements, and in any case paralysis would seem preferable to convulsions. The curative value of these operations is as yet undetermined: that cases apparently have been cured is undoubted, but this same result has followed many other operations, and has ensued upon accidents. It seems probable, however, that the excision of a discharging brain-centre diminishes the tendency to convulsions and affords a much better opportunity of the arrest by medical and other means of the epileptic habit. In chronic epilepsy with no localization of the symptoms the operation of trephining would seem unjustifiable, except in some rare instances where great and persistent headache might indicate the operation for the relief of intracranial pressure.

Among other operative procedures which have been recommended for the cure of epilepsy we may mention circumcision, clitoridectomy, removal of scars, stretching of nerves, cutting of ocular muscles, dilatation of the urethra, ligation of the carotid arteries, ligation of the

[1] To illustrate the importance of trephining in epilepsy which has been preceded by a history of traumatism, we would call attention to the statistics of Mr. Walsham in the *St. Bartholomew's Hospital Reports*, vol. xix. p. 127. He considers 82 cases of trephining for epilepsy. Of these, 65 recovered and 17 died (a mortality far above what we would now expect); 47 were cured; 13 improved; 4 not improved or grew worse. In two-thirds of these cases depression, change in bony structure, or some other morbid condition was noted; in 16 cases no detectable lesion existed.

vertebral arteries, and percussion of the spinal column with a hammer. Recently, Alexander of Liverpool has advocated removal of the cervical sympathetic ganglia, and claims the following results: 24 cases operated upon, studied from four to six years after operation; 6 cured; 10 improved (especially mentally); 5 unimproved; none worse; 2 died, but not from direct results of the operation. Féré has treated successfully 10 cases with the actual cautery. Undue importance has been attached by individuals to the curative effects of particular operations. The removal of any peripheral irritation may be a benefit; any operation by loss of blood, nerve shock, and moral effect may improve the case, but no operation can remove the predisposed brain on which the epilepsy ultimately depends.

**Treatment after Convulsions have Ceased.**—It matters not how the attacks have been controlled, treatment should long be continued: if surgical means have been employed, it should be followed by the use of drugs. Treatment should continue for some years after the seizures have ceased to appear. Dr. Keen holds that five years of freedom from attacks is necessary to give assurance of cure. If a person has ever had epileptic convulsions, he may have them again, and should always be regarded with watchful attention.

## The Complications of Epilepsy.

Prolonged coma following the epileptic paroxysm should be treated by an ice-bag to the head, by a blister to the nape of the neck, and by the administration of arterial sedatives if the pulse be of high tension. In that form which is accompanied by marked evidences of cerebral congestion, designated by Jaccoud the apoplectic, it was the custom of this eminent clinician to bleed.

Syphilitic cases are particularly prone to develop prolonged coma, and should be subjected to full specific treatment besides the use of the ordinary remedies.

**The Status Epilepticus.**—In that condition in which convulsion passes into coma and coma into renewed convulsion without any restoration of consciousness, active measures are necessary to prevent a fatal termination.

Inhalations of nitrite of amyl in large doses (10 to 15 minims) should be administered. It should only be given during the clonic stage of convulsion or the subsequent stage of coma, as in the tonic stage respiration is absent. We may use instead nitro-glycerin hypodermically. Chloroform and ether have been used by inhalation, but the embarrassed respiration renders ether unsafe and chloroform endangers the heart.

In some cases bleeding has been practised with benefit. The state of the pulse may call for arterial sedatives. Paraldehyde as an enema,

with yolk of egg, is often of benefit. Blisters to the back of the neck may do good.

The author has seen the application of the hot iron to the back of the neck arrest the status epilepticus, and has further seen great benefit arise from the hydrobromate of hyoscine. Chloral and bromide of potassium may be given by enema. Syphilitic cases are also not unlikely to develop the status epilepticus.

**Epilectic Insanity.**—EPILEPTIC MANIA.—The great violence, the uncontrollable fury of these cases, and the common existence of homicidal impulses render it absolutely necessary to confine them in asylums. Epileptic mania may be prolonged or transitory, but during its existence a person must be under restraint, and one who is liable to its occurrence is not fit to be at large.

We should treat this violent mania with the end in view of securing sleep and maintaining strength. Hot baths, with cold to the head and the hypodermic injection of the hydrobromate of hyocine, will usually secure sleep. If the case be prolonged, bromide of ammonium and antipyrine should be administered; during the day, the patient should be exercised in the open air, and sleep secured at night by the above-mentioned plan. Food is administered at regular intervals.

EPILEPTIC DEMENTIA.—We should always consider the possibility of the apparently hopeless dementia being due to the excessive use of the bromides, and should withdraw these remedies temporarily or permanently. In the occasional outbreaks of violence occurring in epileptic dements hyoscine is of great service. Milder cases of epileptic dementia need be subjected to no restraint, but marked cases, especially if associated with outbreaks of ferocity, are to be committed to a hospital for the insane.

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## TETANUS.

TETANUS has played a prominent and tragic part in the annals of medicine. It has appeared when least expected, and cases have often multiplied with epidemic violence; it has swept through hospitals, attacked armies, and followed injuries the most trivial as well as operations the most grave. In Napoleon's army in Egypt it was fearfully common. One hundred cases were found by Larrey the day after the battle of Bautzen, in Saxony. In the English army in the Peninsula it was frequently met with. In the armies of the Crimea and in those which fought the war between the States it was a disastrous scourge. In 1858 it was in reality epidemic in the London Hospital. Dr. Joseph Clark tells us that in 1782, 2944 infants died of trismus

neonatorum—a proportion of 1 out of every 6 births—in the Dublin Rotunda.

But tetanus is no longer the mysterious inscrutable disease, coming from we know not where and arising we know not how. It is still frightful, it is yet more frequent than it should be, but the dissemination of the great truths of Pasteur, Koch, and Lister is every year lessening the number of its victims. It no longer sweeps through hospital wards in hideous epidemics, and need not in future be a haunting apprehension to him who performs the operations of surgery. This is due to the discovery of the bacillus tetanii by Nicolaïer. We know for a certainty that tetanus is an infective disease; that it arises from a traumatism, trivial or severe, which admits the micro-organism to a lodgment in the tissues; that this organism multiplies and produces ptomaïnes; and that the ptomaïnes, or the organism and the ptomaïnes, act upon the spinal cord, exaggerating to a great degree its reflex excitability. This bacillus is the cause, and the only cause, and the theories which set down as causes reflex irritation from nerve-injury, ascending neuritis, rheumatism, and sudden temperature-changes are as dead as the humoral pathology or the iatro-chemical school.

In view of our knowledge of the cause of tetanus, we have another reason, were one needed, for *surgical cleanliness* and a rigid adherence to its well-known rules in even the most trivial operations. Perfect asepsis in surgical procedures means freedom from tetanus as surely as it means freedom from septicæmia. The boiling of the instruments is to be conducted with great care, as the spores are difficult to kill, though they cannot stand a temperature of 100° C. for five minutes.

Tetanus is especially apt to follow accidental wounds, more frequently appearing after lacerated wounds than incised, and after punctured wounds than lacerated. In treating every accidental wound we must thoroughly cleanse it and the skin around, irrigate with antiseptic solutions (corrosive sublimate), and provide thorough drainage. We have said that a punctured wound is the most dangerous: the reason of this is obvious. A nail, for instance, runs into the foot: it is surgically dirty, and carries in with it various micro-organisms which are wiped off by the tissues; when it is withdrawn the track it made contracts at different points from the varying degrees of tissue-elasticity existing in the different layers; effusion of serum occurs, and we now have serum, blood, tissue-débris, and bacilli retained under tension and warmed by the body heat; the result being an abscess if pus-microbes are present, tetanus if the bacilli tetanii are there. Hence, in every punctured wound, after the surgeon asepticizes himself and his instruments, he scrubs the skin with soap and water over a wide area; then with ether, and then with a 1 : 500 solution of bichloride of mercury.

He lays the wound widely open with his knife, and open to the very bottom; he removes foreign bodies; scrapes the channel of the nail with a curette; irrigates thoroughly with a 1 : 500 corrosive-sublimate solution; arrests hæmorrhage; and either packs with sublimate gauze, inserts a horse-hair drain, or fastens in a drainage-tube, the wound being finally enveloped in an antiseptic dressing. If these details be carefully carried out moderately soon after the accident, tetanus will almost never occur.

The tetanus of parturition, rare in this country, but not unusual in the tropics, and very frequent in Cuba (Ashton), is prevented by antiseptic midwifery.

Trismus neonatorum is to be prevented by dressing antiseptically the stump of the umbilical cord, instead of smearing it with grease and tying it up in filthy rags.

When we are called to a case of tetanus, our first duty is to look for a wound. This will generally be found, except in those rare cases where there was so slight an injury as to escape attention or where the solution of continuity affected the alimentary canal, as in the case recorded by Baron Larrey in which tetanus arose from a fish-bone sticking into the pharynx.

If a closed wound is found, immediately open it with full antiseptic care, irrigate it thoroughly with corrosive sublimate, swab it out with bromine or pure carbolic acid, pack it with gauze or insert a drainage-tube, and dress it antiseptically.

If the wound is open, distend it to be sure it will drain, enlarging if necessary, remove any shreds of necrosed tissue, and treat it as above. After the wound has been so treated, it should be re-dressed every day or two.

And now comes the medical care of the case. As the disease is an infective one, the patient should be isolated from a hospital ward and placed in a room by himself. The room is to be kept at about 68° or 70° F.; it is to be well ventilated, but free from draughts; the windows are darkened; a screen is put around the bed; and nearly absolute quiet is maintained. We thus seek to minimize peripheral irritations, which, as is well known, tend to induce the exaggerated convulsive seizures. Food is of great importance, and is given every two or three hours. The food is to be liquid: it consists of milk alone or with egg and sherry, beef peptonoids, and other concentrated nutriments. If the patient cannot take it through a feeding-cup, a tube is pushed through the nose into the pharynx, a funnel is inserted into its free end, and the nourishment is poured in. If this manœuvre induces spasm, we should first give an inhalation of amyl nitrite, and if this drug fails to prevent, administer some chloroform vapor. Stimulants are of great value. Many years ago Dr. Rush advocated their use in

large amounts.[1] Alcohol maintains the strength, lessens mental anxiety, and favors muscular relaxation. The best form to exhibit it in is whiskey or brandy. The amount given is gauged by the patient's condition, and varies from 4 to 16 ounces a day. Tonic doses of quinine may be also used.

In this disease constipation is prominent, and the bowels must be moved at least once in every forty-eight hours. We may move them by croton oil, but had best do so by enemas of soapsuds, turpentine, castor oil, or glycerin. As retention of urine is common, we must watch the bladder and be prepared to use the catheter at proper intervals.

A host of drugs have been recommended in tetanus by different observers, and it is difficult justly to estimate their respective merits.

Bromide of Potassium is probably the best and most reliable drug. Wood exhibits the records of 15 cases of tetanus treated by this agent, of which 13 recovered. This agent lowers the sensibility of the cutaneous filaments of sensory nerves, and so cuts off peripheral irritations; "impairs motility,"[2] and, tending toward paralysis, antagonizes spasm, lessens the rate of the pulse and respiration, and lowers temperature. It must be given in large doses, 1 drachm every two or three hours. It may be given alone, or each dose is combined with 10–15 grains of chloral. Small doses are entirely useless. The bromide of sodium may be used instead of the potassium salt.

Atropine.—This drug has been employed with benefit hypodermically: it is especially useful when injected into the tetanized muscles. It acts by diminishing the excitability of the motor nerves and nerve-endings, and lessening the sensibility of the sensory nerves. It is better used as an adjunct to the bromide plan than alone.

Aconite has been recommended. It paralyzes the sensory nerve-terminals and lessens the reflex irritability of the cord. It is apt, however, when used in considerable doses, to induce paralysis of the respiratory centre or of the cardiac motor ganglia, and is unsafe in this disease. Page and De Morgan each report a cure.

Chloral in large doses is of unquestionable utility, inducing paralytic tendencies by its action on the nerve-centres. It is best given with bromide of potassium. Wood reports 9 cures out of 18 cases treated with chloral. Chopart reports 132 cases treated with chloral, with 69 recoveries. Knecht reports 134 cases with 79 cures. Chloral may be given by the mouth, by the rectum, through the nose-tube, or by intravenous injection, the latter method in some instances having been notably efficient.

Nitrite of Amyl.—This drug tends to produce muscular reso-

[1] *Transactions of the American Philosophical Society*, vol. ii.

[2] Bartholow, *Materia Medica and Therapeutics*.

lution and to depress the reflex function of the spinal cord. It is of great use in tetanus to prevent spasm while taking food or medicine. Richardson reports 3 cures, and Forbes 1, from nitrite of amyl alone.

NITRO-GLYCERIN can be used hypodermically, instead of amyl nitrite by inhalations.

ICE-BAG TO SPINE.—This was originally suggested by Dr. Todd, and is unquestionably a valuable addition to any plan of treatment. It allays somewhat the fearful girdle pain from spasm of the diaphragm, and diminishes the frequency and force of spasms. It should be applied from time to time in almost every case.

STRYCHNINE has been commended, but should not be used, as it will add to the heightened reflex excitability of the cord.

TOBACCO.—Mr. Earle was led many years ago, from witnessing the relaxing properties of tobacco when applied to other spasmodic states, to employ it in tetanus. He administered clysters of tobacco in a case of acute tetanus with temporary benefit, but without a curative effect. Sir James Macgregor tried tobacco extensively, and thought the clysters of no avail. Dr. H. A. Hare[1] records 19 cases treated with this agent in the form of injections and fomentations, with 9 recoveries. There seems to be no question that tobacco is of use in the treatment of tetanus. Haughton uses a minim of the alkaloid, nicotine, by the stomach or two minims by the rectum every two hours. We may use instead an infusion of tobacco by enema in doses of 3 or 4 ounces, or the wine of tobacco by the stomach in $\frac{1}{2}$-drachm doses. This drug will not unusually relax the fixed jaw so that food can be given, and also modify, or even suspend, the general rigidity. Its use, however, is not entirely free from danger, as inordinate quantities are capable of inducing asphyxia by paralysis of the respiratory muscles. Tobacco acts by impairing the excitability of the motor nerves, their end-organs, and the motor portion of the cord; it also lowers temperature and induces diuresis and diaphoresis.

GELSEMIUM.—This drug lowers the excitability of the motor portion of the cord, and in tonic doses abolishes the excitability of the sensory portions of the cord. Its action on the motor cord would seem to indicate that it would be useful in tetanus, and cures have been reported. It is given as the fluid extract in doses of 10 minims.

CURARE.—Demme reports 22 cases treated by curare, with 8 cures. If given, large doses are employed. It acts by paralyzing the muscular terminals of the nerves. The crude drug is given in doses up to $\frac{1}{5}$ grain. Curarine can be given hypodermically in doses of $\frac{1}{80}$ to $\frac{1}{40}$ grain. It is an uncertain drug of questionable value.

PHYSOSTIGMA.—Roemer claimed that physostigma cured 20 cases out of 47. Dr. Fraser recommends that in this disease we begin with

[1] *The Physiological and Pathological Effects of the Use of Tobacco.*

hypodermic injections, repeated until the physiological effects of the drug are manifest, at which point the use of the drug by the stomach is substituted in doses three times greater than those employed hypodermically. In the most severe cases, however, he employs it exclusively hypodermically. Fraser strongly urges the use of injections when severe spasms occur or when a fatal result is threatened by apnœa or exhaustion. To an adult he gives 1 grain of the extract by the stomach or $\frac{1}{3}$ grain subcutaneously, and repeats the dose in two hours. He persists in his dosage in order to maintain the physiological effects of physostigma until great cardiac weakness or violent vomiting forces him to stop. Physostigma acts in tetanus by a direct paralyzing influence on the spinal cord. The alkaloid eserine has been used instead of the parent drug.

Hyoscyamus has been used in tetanus. If it be of benefit, it would seem to act by lessening reflex irritations to the cord by lowering the sensibility of cutaneous nerves. Hyoscyamine, its alkaloid, is given in doses of $\frac{1}{60}$ grain increased to $\frac{1}{20}$ or $\frac{1}{15}$.

Duboisine has also been used, but, like hyoscyamus, is of very questionable utility. The dose of duboisine is the same as of hyoscyamine.

Anæsthetics are of use to prevent a violent spasm or to allay the spasmodic tendency, so that food can be taken. Their constant and prolonged use is impossible. In other words, they are more valuable as adjuncts to treatment than as the sole agents. Chloroform is preferred to ether. The introduction of amyl nitrite, however, renders the necessity for anæsthetics comparatively rare.

Opium and Morphine are largely used in tetanus, and in not a few instances have proved curative. Large doses are indicated, and are wonderfully well borne. They, however, constipate to a great degree, and are apt to induce vomiting. Morphine is a valuable auxiliary to treatment by the method of M. Demarquay; that is, by deep injections into the various rigid muscles. By injections into the masseter the subsequent relaxation will often admit of food being taken.

Tetanus Antitoxine.—This is a solid material obtained by Tizzoni and Captain by treating blood-serum with alcohol and drying in a vacuum. The two observers above noted claim that injections of this agent produce immunity in animals. Dr. Kyle[1] says that thus far 4 cases have been reported as treated with this agent, which was used hypodermically in doses of 15 to 25 centigrammes.

Cannabis Indica has apparently done good in some cases. It is often given combined with the bromides.

[1] "Tetanus," by D. B. Kyle, M. D., *Therapeutic Gazette*, Feb., March, April, 1892—a most clear, comprehensive, and valuable article, filled with important facts. I have availed myself of some of his statistics.

Warm Baths are not curative, though they may induce temporary relief. In some cases the necessary movements aggravate the paroxysms.

Conium has some warm advocates. An injection every two hours of 15 minims of the following formula has been suggested:

| | |
|---|---|
| ℞. Conii, | gr. $\frac{1}{10}$; |
| Acid. sulphuric. dil., | ♏j; |
| Aquæ, | ʒj. |

Neurotomy, Neurectomy, Amputation, and Nerve-Stretching are not to be thought of in view of the fact that tetanus is caused by a micro-organism.

Cocaine.—This drug has been tried hypodermically with apparent benefit, but experience with it is as yet too limited to admit of accurate conclusions.

Among other remedies of varied degrees of harmfulness, usefulness, and uselessness are—quinine; venesection; turpentine; cold affusions; mercury; acupuncture on each side of the vertebral spines; tartar emetic; apomorphine; lobelia; arsenic; carbonate of iron; freezing the nerve; heat to the spine; vapor-baths; frictions with oil; blisters to the throat; the actual cautery over the spine; colchicum; cold baths; digitalis; musk; camphor; and the alkalies.

Dr. Yandell of Louisville,[1] in summing up a most valuable report on tetanus by Dr. R. C. Cowling, says: "Recoveries from traumatic tetanus have been usually in cases in which the disease occurs subsequent to nine days after the injury: when the symptoms last fourteen days recovery is the rule, apparently independent of treatment; that the true test of a remedy is its influence on the history of the disease—does it cure cases in which the disease has set in previous to the ninth day? does it fail in cases whose duration exceeds fourteen days?—and that no agent tried by these tests has yet established its claims as a true remedy for tetanus."

[1] *American Practitioner*, Sept., 1870, p. 152, quoted by Hammond in his *Diseases of the Nervous System.*

# LOCOMOTOR ATAXIA, ACUTE INFANTILE SPINAL PARALYSIS, MYELITIS, AND AMYOTROPHIC LATERAL PARALYSIS.

By M. ALLEN STARR, M. D., Ph. D.

## LOCOMOTOR ATAXIA.

### General Treatment.

There are two facts to be noticed before entering upon a consideration of the treatment of locomotor ataxia.

First: the disease from its very beginning depends upon certain changes in the connective tissue and nerve-elements of the spinal cord which are permanent in character, and hence complete recovery in any stage is impossible: all that therapeutic measures can hope to accomplish is to arrest the progress of the changes at the point reached, so that further symptoms may not develop; and this in the majority of cases is impossible with our present knowledge.

Secondly: the natural history of the disease is one of very slow progress, with periods of decided remission in some symptoms and of spontaneous disappearance of other symptoms, and also with long periods during which the patient remains in a stationary condition. Therapeutic measures may result in producing an arrest of the disease or in causing a remission of certain symptoms, yet the history of the use of numerous remedies, formerly employed but now discarded, should teach us that it is often a mistake to ascribe results which may be natural to means which have been employed. It is never to be forgotten that the desire for relief and the expectation that it is to follow the use of a remedy are potent factors in producing temporary results. When, therefore, remarkable results are claimed for any new remedy in the treatment of locomotor ataxia—as, for example, electrical applications, nerve-stretching, and suspension—the wise physician will show a becoming scepticism, even when making use of every means which may give the patient relief, and will wait for time to prove what is of actual service.

Climate.—Patients suffering from locomotor ataxia are usually very susceptible to changes in the barometer and in the humidity of the

atmosphere. They are more comfortable in a warm, dry climate, and any sudden change to cold or to wet weather produces an increase in their pain and inco-ordination. They also appear to suffer more in high altitudes. Therefore it is well for those who can afford it to seek to mitigate their sufferings by residing in the South during the winter and in the North during the summer. The climate of Southern California is perhaps the most equable during the winter months, and is certainly less cold and damp than that of Florida or of the Riviera, although these latter are preferable to a northern climate. The increased susceptibility to cold makes it necessary for the comfort of the patient to keep the temperature of his house during the winter at about 70° F., and to protect him from draughts. Yet it is rarely, if ever, advisable for him to abandon such an amount of out-of-door life as is most conducive to health and vigor.

**Diet.**—It cannot be claimed that any particular form of diet is advisable in this disease. It is not to be forgotten, however, that it is of great importance to keep the patient in a good general condition, and to increase, if possible, the nutrition of the body, thereby retarding the disintegration of nerve-elements. Any system of diet which, by excluding certain classes of foods, tends to derange the processes of digestion and nutrition should be avoided. I have seen patients much harmed by following rigid methods of diet, such as a strictly non-nitrogenous diet, or a diet of meat, bread, and hot water, or a vegetarian diet, and therefore I believe that a generous diet, including all forms of food, with a slight excess of fat in the form of cream or cod-liver oil, is to be recommended. A rather free supply of water is conducive to the elimination of waste products, and the use of coffee, tea, and beer or light wines in moderation need not be forbidden, though any indulgence in spirits is to be avoided. Tobacco may also be allowed.

**Exercise.**—From the earliest stage of the disease the patients complain that any effort, especially that of walking far or standing for a long time, produces an unusual sense of fatigue. It seems reasonable, therefore, to limit from the outset the amount of exercise taken, and, without confining the patient to the house or to his chair, it is well to caution him against any form of exertion which is sufficient to produce discomfort. Later in the course of the disease, when any movement is attended with difficulty, it may be necessary to urge upon the patient the dangers of taking to his couch or bed, and even in the stage of helplessness it is far better for him to sit up during the greater part of the day, as there is no question that the venous congestion of the spine produced by constant lying on the back is productive of an increase of pain in this disease.

**Massage.**—During the early stage and during the last stage massage may be of service. In the early stage deep massage to the mus-

cles of the back promotes the flow of venous blood through the spinal vessels and their anastomotic branches, and is the best means of relieving the congestion which is supposed to exist. Given at night, it often prevents the onset of paroxysms of pain and secures sleep, especially if the patient can be taught to lie on his belly and not on his back. In the last stage, when almost all voluntary motion is impossible, general massage, by promoting venous return, gives much comfort and aids nutrition. In the long-stationary stage of ataxia, when pains are not severe and when sufficient exercise can be taken for keeping up a fair circulation, massage is not needed. In some cases the tenderness of the skin prevents its use at all times.

**Baths.**—Almost every form of hydro-therapy has had its advocates, and it must be admitted that there is no method of treatment more serviceable in chronic spinal affections than the use of baths. To obtain the best results the patient must be sent to some mineral bath in the country where the combined influences of change of air, scene, surroundings, and diet, with the régime of a water-cure establishment properly conducted, can be secured. In the summer months a cool mountain-resort is to be selected. In the winter a southern mild climate is to be sought. It is much to be regretted that this country offers few such establishments as are to be found in France and Germany. It is possible, however, to find in many regions the proper facilities for bathing, and well-arranged establishments are rapidly multiplying as the need is felt. The mineral constituents of the water are of much less importance than the temperature of the bath, and when the latter is correctly regulated it makes little difference whether the spring furnishes sulphur or saline or iron water.

It appears to be quite generally admitted by those who have had experience with the use of baths in this disease that tepid and warm baths are preferable to all others. Hot baths—of a temperature exceeding 97° Fahr.—are considered injurious. They may relieve certain symptoms temporarily—in fact, no means will act more quickly than a hot bath for the relief of pain—but the ultimate effect of a succession of hot baths is to increase the rapidity of progress of the disease and to intensify the symptoms. Cold baths—of a temperature below 65° Fahr.—are also injurious. It seems probable that damp cold air or exposure to wet and cold are factors in the production of locomotor ataxia, and the discomfort resulting from a cold bath is very great to the majority of patients. When baths are used it is better to have the temperature of the water vary between 70° and 90°, as within these limits a sufficient alternation of heat and cold can be secured.

There are many methods of using water in baths. Spinal douches may be given by directing a stream of water of some force from a spout against the entire length of the spine, the temperature of the

water being varied during the douche from 90° down to 70°, or else being kept constantly at 85°. This may be used for ten seconds daily. Or the patient may have the spine sponged with water while he sits on the edge of a tub or in a sitz-bath. The sudden alternation from heat to cold, 90° to 70°, in such sponging may be employed at the end of the bath. Both these methods are to be followed by brisk rubbing with warm towels. A full bath at 90° for twenty minutes is a method frequently employed, and when a course of iodide of potassium is being pursued this is to be used daily. The "salt rubs" and "alcohol baths" of various establishments are not objectionable, provided the temperature of the water be within the limits prescribed.

It is evident that all these procedures act upon the spinal circulation, either by affecting the calibre of the vascular system in general or by producing such peripheral irritation of the skin as to cause reflex vasomotor effects. In either case the circulation in the cord is stimulated, congestion whether arterial or venous is relieved, and waste products removed, with the result of increasing the nutrition. Such measures may be carried on at home, provided the patient's means do not admit of the expense of a residence in an establishment.

Baths are not to be continued for very long periods consecutively. It is better for this method of treatment to be used thoroughly twice or three times a year for a period of two or three months, and then stopped.

The use of tepid packs to the extremities or to the abdomen for an hour or more for the relief of pain is highly recommended. The extremity is enveloped in flannel wrung out in warm water and covered with oiled silk. The damp heat often relieves the lancinating pains promptly.

**Counter-irritation.**—Counter-irritation to the spine, whether by blisters, cautery, setons, ice-bags, poultices, or cups, has been generally abandoned as a means of cure. In some cases pain, if severe, may be relieved by the application of an ice-bag to the spine for a short time or by the use of dry cupping. These, however, are of but temporary service, and are probably not without a harmful influence upon the progress of the lesion.

A mild form of counter-irritation to painful parts is sometimes of service in relieving the severe pain. The part may be stroked with a faradic brush, may be heated by a mustard poultice, blistering being avoided, or may be stimulated by liniment, the surface irritation appearing to counteract the pain of central origin. In all local applications in locomotor ataxia it should be remembered that great care is to be observed, for the senses of pain and temperature are often impaired, so that the patient is unable to perceive degrees of heat or pain which are harmful. If hot foot-baths are used, the feet should not be blis-

tered unwittingly, and if hot bags or poultices are applied, they must be watched, as no reliance can be placed on the patient's sensations.

**Electricity.**—Electricity is an agent which has for the past fifteen years been used quite generally in the treatment of chronic spinal diseases, including locomotor ataxia. A galvanic current has been recommended by Erb and others as the only form of electricity which influences the progress of the disease. It is applied to the back, one pole being placed upon the neck or between the shoulders, the other low down upon the lumbar region. The upper pole is sometimes placed over the sympathetic ganglia in the side of the neck, though no evidence has ever been furnished of any direct action upon the sympathetic nerves, and if this method is used it is wholly empirical. A current of medium intensity is usually preferred; that is, a current not greater than 20 milliampères in strength, the electrodes employed having an area of about 100 square centimetres (3 by 5 inches). The direction of the current, whether ascending or descending, appears to be a matter of indifference. The duration of the application may be from three to ten minutes daily or every other day.

Those who were at first enthusiastic regarding the effects of electricity in locomotor ataxia appear to be gradually modifying their opinions, and, although this method of treatment is still pursued by some specialists, it is now discarded by many others. It is a matter of much doubt whether a current as weak as that mentioned affects the spinal cord at all. It certainly fails to produce any subjective peripheral sensations, which is the test of its reaching and affecting a peripheral nerve, such as the sciatic. On the other hand, when much stronger currents are used there seems to be some danger of unpleasant results, such as vertigo and a sudden increase of the symptoms of the disease. So little is still known of the exact effect of galvanism on the spine, and the knowledge of its action elsewhere leads so directly to the conclusion that it cannot have any effect upon the progress of a sclerosis, that it seems incumbent upon those who persist in this treatment either to bring forward some positive results or to clear themselves in some other manner of a suspicion of great credulity. For my own part, I agree with Gowers and Möbius that as a therapeutic agent in locomotor ataxia it is useless, either as a direct agent affecting the progress of the disease or as a means of treating individual symptoms.

**Suspension.**—The most recent method of treatment proposed is that of suspending the patient by his head and arms for half a minute or longer daily. This is done by means of an apparatus used by orthopædic surgeons for suspending a person during the application of a plaster jacket. The only care necessary is so to adjust the supports as to make less traction by the head than by the arms, and to pad the support under the arms, so that serious compression of the nerves

and veins of the axilla shall be avoided. The patient is pulled up slowly until the feet are clear of the floor. On any expression of discomfort or any appearance of syncope the process is to be stopped at once. It is thought best to begin by a short séance—one half minute—and gradually increase the duration to three, or even four, minutes daily or twice daily.

This method is not considered curative, but has been said to cause relief of many symptoms, cases being recorded in which pain diminished, bladder and rectal control was re-established, sexual power was restored, and the ataxia so much relieved that walking was made more easy. It has been said that a return of the knee-jerk occurred during the treatment.

During the first year in which the method was employed reports of great improvement in many cases were published. Russell and Taylor[1] collected 255 cases recorded by Continental observers, in 67 per cent. of which a distinct improvement was noted; in 30 per cent. no improvement occurred; and in 3 per cent. the patients became worse. They could not confirm these results, however, by their own experience, for out of 32 cases only 6 improved, 23 did not improve, and 3 became worse. The experience of Erb, Bernhardt, and Dujardin-Beaumetz seems to agree with that of Russell and Taylor. My own experience in about 20 cases is even less favorable, there being but 1 patient out of the 20 who now, at the end of two years, considers it worth while to keep this treatment up. There is certainly no objection, however, to its employment. The apparatus is not expensive, it can be put up in any house, and a patient can soon learn its details sufficiently to have it carried on at home by a servant or member of his family. But the more recent reports on all sides confirm the suspicion that suspension, like nerve-stretching and the actual cautery, is not destined to become a permanent method of treatment in locomotor ataxia.

### Medicinal Treatment.

In the majority of cases of locomotor ataxia syphilis has been the probable cause. It is not supposed that the disease is an actual manifestation of syphilis, but that it is a sequel of it. Whenever a history of previous infection is obtained or whenever its existence is strongly suspected, it is justifiable to make a trial of specific treatment, for experience has proved that in a considerable percentage of cases this has been of benefit. Mercury is to be used by inunction, ½ drachm of the ointment being rubbed into the skin daily until a slight physiological effect is produced. It is well to mix the officinal blue ointment with an equal part of lard or simple cerate, as absorption is then more complete. The inunction may be made upon the back or

[1] *Brain*, 1890, vol. xiii. p. 217.

upon various parts of the body and extremities, a new part being chosen daily. It is better absorbed if the part selected be thoroughly washed with warm water and soap, and then with alcohol or ether, before the application; and after the application—which should be thorough, and therefore should take half an hour—a tight flannel bandage should be applied over the part rubbed; thus what is left on the surface is gradually absorbed. It aids materially in the effect if the patient takes a warm bath (90° F.) daily for twenty minutes. The production of salivation is to be avoided. If inunctions cannot be employed, the mercury may be given by the stomach, the protiodide, in dose of from $\frac{1}{6}$ to $\frac{1}{3}$ grain three times daily, being the best preparation. The amount may be increased gradually until a slight diarrhœa is produced, and then a dose a little less than that which caused the diarrhœa may be kept up for some time. Corrosive sublimate may be employed—from $\frac{1}{40}$ to $\frac{1}{30}$ grain three times daily—in the same manner. The advantage of the method by inunction is that it does not affect the digestion unfavorably. Iodide of potassium is to be given in connection with the mercury in gradually increasing doses, from 15 to 100 grains three times daily. It should be administered, very largely diluted, in an alkaline water after meals or else in a bitter tincture before meals. It is well to reduce the large dose of the iodide after a month, and then to continue it in 25-grain doses three times daily for two or three months longer. If free elimination of the iodide is secured by the use of laxatives, of diuretics (of which water is the best), and of warm baths daily, it can be taken for a long period.

It is well to make a thorough trial of this treatment in cases of locomotor ataxia, and if a decided improvement takes place it is well to continue the iodide and to repeat the course of mercurial inunctions at intervals of four months, each mercurial course lasting from two to four weeks, according to the toleration shown by the patient. In cases in which there is a subacute spinal meningitis with the sclerosis this treatment gives the best results. It is to be remembered that the use of mercury hastens the process of optic-nerve atrophy, and therefore in the class of cases of locomotor ataxia in which optic-nerve atrophy is the initial symptom—a class quite easily separated from the ordinary type—this line of treatment is not to be employed.

In cases which are not syphilitic in origin or in which specific treatment has failed one may use other drugs. The best line of treatment, in my opinion, is the use of arsenic in small doses (arsenious acid, $\frac{1}{40}$ grain three times daily) or the continued use of corrosive sublimate, $\frac{1}{50}$ grain three times daily, or both used alternately. Arsenic is one of the best nerve-tonics, and may possibly retard the disintegration of nerve-fibres in the sclerotic areas of the cord. Corrosive sublimate

is believed by many to retard the production of connective-tissue inflammations.

Ergot, which was formerly extensively employed, either in the form of fluid extract ½ drachm, or of ergotin, ⅓ to 1 grain three times daily, is not, in my experience, of any permanent benefit. If it is used, it should not be given continuously, but only four days in every week (Charcot).

Nitrate of silver has also been used for many years, and still has some reputation. It is to be noted that this drug has usually been given in pill made up with a vegetable extract. As a matter of fact, when thus prepared it turns into an oxide of silver within a day or two; hence it is quite likely that patients have not had the benefit of the drug. It should be administered with kaolin in a capsule. When so given it is very liable to disturb the stomach, and if kept up for any length of time discolors the gums, mucous membranes, and skin a dark blue. On the first sign of such an effect it should be stopped. Recently the use of this drug hypodermically has been urged, but it is too soon to report success.

Strychnine is universally discarded in the treatment of ataxia, excepting as a temporary remedy for the relief of incontinence of urine, in which it occasionally succeeds.

Belladonna has also been tried, but seems to have little claim to usefulness.

There has not as yet been found any drug which can be said to be curative in the disease.

There are certain symptoms of locomotor ataxia which require treatment. Pain is the chief one, and for this the most valuable remedies have been discovered recently in antipyrine, acetanilide, and phenacetin. Given preferably in a triturated powder in their ordinary dose and repeated two or three times a day, they succeed in quieting pain very well. I prefer to prescribe each remedy separately, using each for one week at a time and changing about, so that the dose need not be constantly increased. Salicylate of sodium, in 10- to 20-grain doses, sometimes acts when the drugs just mentioned fail. In many cases, however, recourse must be had to opium, codeine, or morphine. It is often possible to combine these drugs with others which neutralize their disagreeable effects, as in Brown-Séquard's neuralgic pill. Eventually, the hypodermic use of morphine may be resorted to, and seems to be wholly justifiable in a disease which is very painful and chronic.

The treatment of painful areas by the faradic brush, by cold or hot applications, or by cupping the spine has already been alluded to.

Against the crises of locomotor ataxia we have but one sure remedy—viz. morphine hypodermically—and this should be used freely to

relieve these distressing symptoms. Antipyrine and phenacetin have been recently recommended in the treatment of gastric crises.

The sense of stiffness which attends this stage of ataxia is frequently relieved by the use of warm baths, as already described.

The jumping of the limbs which often annoys the patient toward evening is best controlled by bromide of sodium, given with Hoffman's anodyne.

The chronic constipation usually requires the habitual use of some laxative, especially if opium is being employed for the relief of pain.

Chronic cystitis, bed-sores, or ulcers of the foot must be treated according to the usual methods described in surgical textbooks.

For the optic-nerve atrophy no treatment seems to be of avail, although hypodermic injections of strychnine and the use of iodide of potassium have their adherents.

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## ACUTE INFANTILE SPINAL PARALYSIS.

At the onset of this disease, when the fever is high and when an acute congestion of the spinal cord is present, it is important to use antipyretic measures and also local counter-irritation to the spine over the site of the lesion. The best antipyretics in children's cases are cool baths, sponging with alcohol, and the internal administration of antipyrine or phenacetin. A spinal ice-bag may be applied for an hour at a time. The counter-irritation may be excited either by dry cups, repeated every three hours for two days, or by a blister. At this period it is important to prevent the child from making any voluntary movements, and to keep it in a prone position or on its side, rather than on its back in bed. A brisk purgative is to be given at the beginning of treatment, and nourishment is not to be neglected. Children are so restless when ill that it may be necessary to give a sedative in the form of bromide of potassium, and this may be combined with fluid extract of ergot, which all authorities agree should be given in the early stage in full doses—*i. e.* 10 drops every four hours for a child of one year, 15 drops for a child of two years, 20 drops for a child of three, and 25 drops for a child of five. The hypodermic injection of ergotin, $\frac{1}{6}$ to $\frac{1}{3}$ grain, is objectionable, as the local irritation is extremely painful. It is questionable whether the large doses of iodide of potassium recommended by Ross, in conjunction with inunctions of mercury to the spine, can be of service in such an acute disease.

The ordinary measures used in acute febrile diseases for the relief

of gastro-intestinal symptoms may be employed if necessary. In the cases which begin with convulsions bromide of potassium or chloral by the rectum may be used.

After the acute stage of onset is over the patient is found to be paralyzed in one or more limbs, and this paralysis requires persistent and careful treatment, both for the purpose of restoring power and in order to prevent deformities.

It is to be remembered that each muscle is controlled by a group of cells in the spinal cord, and just in proportion to the extent of disease in the group will be the paralysis of the muscle. If all the cells in the group are destroyed, the muscle will be totally paralyzed. If some or many of the cells remain intact, the muscle may regain some or all of its power. It appears that half a group may by stimulation and training be made to do the work of an entire group, and hence treatment properly directed is of service. The name "regressive paralysis" once given to this disease indicates that some return of power is the rule.

A direct stimulus to activity in the motor cells may be given by means of strychnine. It is to be recollected that this produces hyperæmia of the cord, and therefore should never be given until the acute onset is over: a good rule is not to give it within a month of the onset. After that time it is to be pushed until slight twitching of the normal muscles, or at least decided increase of the spinal reflexes, is produced. It is probably better to employ strychnine for some months in the dose found to produce such symptoms, but to give it only four days in each week, as the intermittent use seems to stimulate the cord more than continuous use. I am accustomed to use arsenious acid, $\frac{1}{40}$ grain three times daily, in connection with the strychnine, as a nerve-tonic. The two may be administered together in a tablet, which is easily given to a child, or may be dissolved if the child cannot swallow it.

Much more important, however, than internal medication is the direct stimulation of the muscles. Voluntary exercise is the best method of such stimulus, and when any movement can be produced voluntarily it should be encouraged and persisted in for years. It is an easy matter for any one to invent an apparatus for the exercise of muscles, and any carpenter can construct it. Weights hung upon pulleys, or boards balanced on a fulcrum and weighted or under pressure of springs, will afford the necessary resistance, and as the muscle grows stronger the resistance may be increased. The child must be made to perform these requisite exercises two or three times a day, and, as they can be made a part of its play by an ingenious mother, they need never be neglected. Just as a normal biceps may be developed in a gymnasium to twice its original diameter, so by exercise a half-paralyzed

muscle may be brought up to a point at which it will do an amount of work nearly equal to the normal. There are few cases in which voluntary power is entirely gone, and therefore such exercises are possible for the majority of children who suffer from the disease.

Next to voluntary exercise, every possible means is to be employed to increase the nutrition of the paralyzed limb. Massage, thorough, systematic, and skilful, should be used twice daily. Frictions with hot and cold water, or with salt followed by hot douching, or with alcohol, are of undoubted use, and the limb should be well protected from cold by extra clothing, since its circulation is always imperfect.

Electricity applied to the muscles will secure their contraction, and hence will exercise them when voluntary exercise is impossible. At the same time, applied in the form of galvanism, it promotes all those chemical changes in the parts near the poles which are essential to growth. To the muscles which respond to faradism a faradic current should be applied for ten minutes daily. Such response may be obtained in muscles which are only slightly paralyzed, and these will recover spontaneously in time, but will regain their power more rapidly under faradic treatment. The muscles which are seriously affected do not, however, respond to faradism, and to these it is necessary to apply an interrupted galvanic current, faradic applications being useless. These muscles respond more vigorously when the positive pole is placed on the muscle; hence that is the pole to be used, the negative being placed on the back. The interruptions should be made by an electrode held in the hand and provided with a finger-key, and each muscle should be treated for about three minutes daily: about 100 interruptions can be made to the minute by the finger. The strength used should be the least which will secure a contraction in the muscle. When interruptions of the current do not produce a prompt response, alternations of the current may be employed by placing either pole on the muscle, and the other on the same limb about a foot away, and reversing the current by means of the pole-changer on the battery. The reversals can be made by the hand at the rate of 60 a minute, or by some little mechanism at a more rapid rate.[1]

It is to be remembered that in this disease the application of electricity is much more painful than in health. It is also to be remembered in applying electricity to children that their confidence must be gained and the fright produced by the sight of the apparatus allowed for. It is my habit to begin a course of electrical treatment in a child by several applications of the sponges and electrodes while no current is passing, thus accustoming the child to the apparatus, then to apply an exceedingly weak current, and gradually increase its strength day by day until, at the end of ten days or more, I am using the desired

[1] See *Amer. Journ. Med. Sci.*, Oct., 1891, p. 364.

strength. In this way a daily struggle, with the result of an unsatisfactory and probably useless application, is avoided, and the parents' consent obtained to a course of treatment which they would eventually object to if every application resulted in a tearful scene.

Any intelligent mother or nurse can be taught to give galvanism to a child in this manner, and it should be made a matter of interest to her from the start, so that she will observe what is being done, and thus gradually come to understand each proceeding. I find it better with many mothers and nurses to ask their aid, and direct them what to do, until I see that they have become used to the process, before suggesting that they can do it themselves, as thus they acquire the routine better than when attempting to learn it by direct instruction.

Such an application may be made daily for two or three years. If the muscle grows under this treatment, it should be kept up longer. But if exercise, massage, frictions, and electricity have had no apparent effect at the end of two years, there is no use in any further local treatment of this kind. I do not apply the electrical current to the spinal cord in these cases, as I believe that it has no effect whatever upon the pathological process which is present.

The use of apparatus plays a great part in the treatment of infantile paralysis. The importance of voluntary exercise has already been enforced. It is to be remembered that many weak muscles can do their work only when the limb is placed in an advantageous position. Hence an apparatus may enable the child to exercise a muscle by voluntary effort when unsupported this would be impossible. Again, many muscles give support to joints as part of their function, and if this support is removed it may be supplied by a brace. Lastly, the result of paralysis in one group of muscles is to allow the joint to be bent by its opponents or to yield to the influence of gravitation, and hence the paralysis is often followed by deformity which a brace may correct. Every one knows that a brace properly applied may enable a helpless cripple to walk; and it must be admitted that there is no disease in which orthopædic apparatus gives more marked benefit than in infantile paralysis. It cannot be applied too early, as it may then prevent the development of contractures and deformity. There is no stage in which it is too late to fit a brace, even though tenotomy be needed in addition and as a preceding necessity. Each case has to be inspected and studied carefully, and a particular apparatus fitted properly to it, the ready-made braces of the shops being usually worse than useless.

Many a child has been saved a bad club-foot by the early application and constant use of a proper brace to the leg, the other means of treatment already mentioned being employed as well. Many a child with a bad club-foot can be made to walk quite naturally by tenotomy,

plaster splints, and then a proper brace. And when the importance to recovery of voluntary exercise is considered, it becomes evident that anything which puts the child on its feet is to be employed early. For the arm, various contrivances, such as rubber bands running in bracelets as a substitute for muscles, are to be invented. In the rare cases in which the spinal muscles are involved an apparatus to rectify the curvature must not be neglected. Reference must be made to the works upon orthopædic surgery for details regarding such apparatus; and it is my experience that more satisfactory results are obtained by having the apparatus constructed under the direction of an orthopædic surgeon than by a mere medical-instrument-maker instructed by a well-meaning but ignorant physician.

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## MYELITIS.

ACUTE MYELITIS, whether general or transverse, traumatic, hæmorrhagic, or of unknown origin, requires active treatment in order to arrest the destructive process which advances rapidly in the spinal cord. If there is a fracture or dislocation of the vertebræ, with pressure on the cord, prompt surgical interference by operation should be resorted to, that the effects of pressure upon the cord may if possible be removed. Since continued pressure is sure to lead to myelitis and degeneration in the cord, with a resulting permanent paralysis, it is best to remove it immediately, even at some risk, and even though it seems probable that the cord has been lacerated as well as compressed at the time of the injury.

If this is impossible, the case is to be treated as if of non-traumatic origin. When the disease is not of traumatic origin the patient is to be kept at perfect rest in a prone position, and counter-irritation by wet cupping is to be used along the spine or over the particular level affected, if this can be localized, and an ice-bag is to be applied to the spine for some hours at a time, and renewed at intervals, freezing being avoided. If the patient is weak, dry cups may be used instead of wet ones, or an actual cautery may be applied lightly so as not to cause a blister. Blisters are to be avoided, as they may result in bed-sores. While this external treatment is being used the patient should be purged once by jalap or calomel, and subsequently by saline laxatives, and be given diuretics freely. His diet should be simple, and during the first week rather scanty, unless he is decidedly feeble in health. Cleanliness of the skin and genitals is to be secured, especially when the sphincters are relaxed, by very frequent changes of position,

by washing, by rubbing with alcohol and alum-water, or by oiling the surface with vaseline. Numerous small pillows should be used about the body, and so disposed that its weight should be evenly distributed, instead of being borne by the bony prominences, or else a water-bed should be provided. A bag of oiled silk filled with absorbent cotton should be placed upon the genitals to catch the urine, and changed very often, and the genitals should be frequently cleansed with warm water and then oiled. In this way it is possible to avoid bed-sores and ulcerations of the skin in some cases. Very careful observation of all these details in the beginning may save much trouble in the care of bed-sores later on. A patient should never lie continuously in one position more than an hour, and when the beginning redness of the skin indicates that pressure has been made upon it, pads and pillows and rings of wadding or of oakum should be applied immediately to take off such pressure. It is to be recollected that very frequent changes of position, even in sleep, are normal, and take place without notice, being automatic. But in myelitis the reflex and automatic acts are impossible, and must be performed for the patient by his attendant.

If the bladder and rectum cannot be controlled, it is necessary to draw the urine regularly every four hours, and to wash out the bladder with a warm solution of borax (1 drachm to the pint) twice a day, to prevent the occurrence of cystitis. The rectum should be emptied by a full enema of soap and water daily. The fact that death in this disease is usually due to cystitis or to bed-sores should enforce the absolute necessity of the greatest care in their prevention and treatment. If cystitis has developed, it is to be treated in the customary manner. If bed-sores have occurred, they are to be dressed daily with carbolized vaseline, balsam of Peru, or oxide-of-zinc ointment, after thorough cleansing with a solution of corrosive sublimate. The fact that such sores heal very slowly, even under the most favorable conditions, is proof that the lesion in the cord has cut off certain trophic influences from the parts.

The only medicinal treatment of myelitis during the acute stage is the giving of ergot in drachm doses and iodide of potassium in 10-grain doses three times daily. Belladonna is no longer employed.

Chronic myelitis is usually the result of an acute attack, but may develop without an acute onset. In either case the treatment will be the same. If the patient is confined to bed, he should be made to change his position frequently, and the same precautions against bed-sores and cystitis are to be employed as in the acute disease. If possible, he should be made to sit up and be taken out in a wheeled chair. If he is able to be up and about, all unnecessary exertion, especially walking, and all sexual excitement, are to be avoided, and exposure to cold or dampness is to be guarded against. Tonics are to be used

freely, iron, quinine, arsenic, and strychnine being employed in succession or in combination. The question of the use of strychnine is a disputed one. In chronic diffuse myelitis, where reflex excitability is not great, it may be employed, given in doses of $\frac{1}{40}$ grain three or four times a day for two weeks. If, however, there is much irritation of the limbs, as in transverse myelitis, it is to be avoided. In the chronic stage counter-irritation of the spine appears to give some relief at times, and the actual cautery may be used lightly. The tone of the muscles is to be kept up by the use of massage, salt rubbing, and electricity, as in cases of acute infantile palsy in the chronic stage. In mild chronic cases of slow progress the rules given regarding the use of baths in locomotor ataxia apply. Douches to the spine of hot water or of hot followed by cold water are of service in this class of cases. In the more severe cases baths are not easily employed. The rigidity of the limbs with contracture, which develops in many severe old cases, is best combated by the use of long-continued warm baths, 90° F., for half an hour daily or twice a day.

Chronic myelitis is rarely the result of syphilis, and even when it is a course of specific treatment is not generally of much use. Whether iodide of potassium, which is usually administered for a long time in chronic myelitis, does any good is a question which cannot be decided. It may be tried in the absence of more efficient remedies. Galvanism applied to the spine in the same manner as in locomotor ataxia has been thought to be of service, and may be employed. I have never seen any positive result from its use, and it is never to be employed in the acute stage of myelitis. The same symptomatic remedies which are discussed in the section on Locomotor Ataxia are to be employed in chronic myelitis.

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## AMYOTROPHIC LATERAL SCLEROSIS.

THE treatment of amyotrophic lateral sclerosis and of its allied affection, bulbar paralysis, like that of progressive muscular atrophy and of primary or secondary lateral sclerosis, requires but a few words. In these diseases there is a tendency of the lesion to progress slowly but steadily in spite of every form of treatment which has been adopted, and no means has as yet been found to arrest the course of these diseases. The care of the patient, rather than his cure, is therefore the work of the physician. The remarks regarding diet, exercise, climate, and baths in the section on Locomotor Ataxia apply to these diseases, and need not be repeated. In amyotrophic lateral sclerosis rest is very important, and seems to retard the progress of the case. Strong tonic

treatment is indicated, but strychnine is to be used with great caution, and suspended if reflex excitability becomes marked. The exercise of the paretic muscles by electricity is merely a palliative measure, for even if the muscles grow in size by exercise, the cells which control them are degenerating and a progressive atrophy will not be prevented. And in these diseases the most enthusiastic advocates of galvanism to the spine have admitted the uselessness of treatment. It should therefore be the object of the physician to keep the patient's health in good order and to use symptomatie remedies as they may be needed.

# APOPLEXY, BRAIN TUMOR, SPINAL TUMOR, MENINGITIS, CEREBRITIS, AND NEURITIS.

By CHARLES K. MILLS, M. D.

## APOPLEXY.

The term *apoplexy* has been and is still used in several ways, but most correctly in describing an attack of sudden insensibility, the word "stroke" having popularly the same meaning. This insensibility may come on in various ways, and it will present features which will differ according to the severity, character, and site of the lesion to which it is due. In a common type of cerebral apoplexy the attack is preceded by such symptoms as dizziness, tinnitus, headache, changes of color in the face, and nausea or vomiting, although any one, several, or even all of these prodromes may be absent or others may take their place in a particular case. After, or without, such preliminary symptoms the patient loses consciousness, as a rule suddenly; his breathing becomes stertorous or Cheyne-Stokes in character; and examination shows paralysis of one side of the body, sometimes of motion only, and sometimes both of motion and sensation; while other phenomena often present are conjugate deviation of the eyes and head, fixed and it may be irregular pupils, absence of or marked changes in the reflexes, and involuntary evacuations of urine and fæces.

This will answer for a brief general description of the most usual, or at least the best-known, form of apopletic seizure, but variations even in what might be designated the standard form of attack occur. The most marked differences in the state or degree of impairment of consciousness may be present: sometimes the loss is profound and complete, and may last for hours and even days; sometimes while deep it is short, even momentary or lasting for a few minutes only; sometimes it improves and deepens again.

The motor paralysis and loss of sensation may vary considerably. In a short time the attack may change its character for better or worse. When the patient does not succumb immediately or soon, in typical cases the symptoms assume more or less regular features as to temperature, respiration, pulse, and even paralytic phenomena at certain stages of the progress. My object, however, is first to

make clear the peculiarities and nature of the initial stroke and their meaning, in order that the method of dealing with them may be better understood. Later I will consider the occurrences of the periods following the acute attack.

The symptom-picture often designated apoplexy may be caused by a variety of pathological conditions, as, for example, by hæmorrhage into the brain or its membranes, by congestion of the brain, cerebral embolism, or thrombosis, by uræmia, sunstroke, or the ingestion of a violent poison. The most common types of apoplexy are due to cerebral hæmorrhage, embolism, or thrombosis, and frequently the word is used by physicians as synonymous with hæmorrhage into the brain. My chief concern will be with this form of apoplexy, although some attention will necessarily be given to the occurrence of seizures from embolism or thrombosis of intracranial vessels, as well as to the other affections which simulate cerebral hæmorrhage.

It would be best to abolish the use of the word "apoplexy" as a name for a disease, and discuss treatment, pathology, symptomatology, or anything else from the standpoint of lesions the nature and location of which are known, as intracerebral hæmorrhage, embolism, or thrombosis; but one practical reason for the retention of the term as a heading for articles is that the mass of practitioners are in the habit of considering their cases with reference to the stroke or seizure, and also of searching for information from the same point of view. Properly speaking, the term is one descriptive of a symptom or group of symptoms, but the same is true of many other terms used in medicine; for example, headache and diabetes. Hæmorrhage into the lungs or other organs is now often described as an apoplexy; nevertheless, with the profession at large, apoplexy retains its old significance, that of a stroke of insensibility caused by a hæmorrhage somewhere within the skull.

Several forms of brain attack which are spoken of as apoplexies are sometimes confounded with cerebral hæmorrhage, as the so-called nervous apoplexy, serous apoplexy, and congestive apoplexy, or acute hyperæmia of the brain and its membranes. Nervous apoplexy had better be dismissed entirely, as the use of the expression is probably simply an evidence of insufficient knowledge. It has been employed to describe cases presenting sudden abolition of consciousness and motion, with disturbed respiration and circulation, and ending fatally, in which no lesion has been found on careful examination after death. Some of these cases are due to uræmia or other forms of cerebral toxæmia, and evidence has accumulated to show that apoplectic seizures associated with or followed by such unilateral symptoms as hemichorea, hemispasm or monospasm, hemiplegia or monoplegia, sometimes occur in the course of Bright's disease, autopsies revealing no trace of a focal

lesion small or great. Several French observers and Dercum[1] of Philadelphia have reported such cases. This is of course important to bear in mind for therapeutic reasons, as treatment directed to the relief of the kidneys and the general toxæmia is indicated rather than that for cerebral hæmorrhage or other isolated lesion of the brain.

Lidell[2] is inclined to attribute the nervous apoplexies to irritation reflected to the brain from distant parts, but a more probable explanation of such cases is on the nephritis hypothesis given above, or on the view that the cases are due to hysteria, to syphilis, or perhaps even to gout or rheumatism. The rare attacks of so-called cerebral gout and cerebral rheumatism sometimes give apoplectiform phenomena which closely resemble those which are produced by cerebral hæmorrhage, embolism, or thrombosis, but usually in such cases a gouty or rheumatic history, or symptoms of these affections in other parts of the body, are present.

Serous apoplexy has more importance and cannot be so lightly dismissed. Every one who has made many autopsies knows that one of the commonest conditions found in patients who have died from brain disease or at least with brain symptoms is an excess of serum or of cerebro-spinal fluid, either in the ventricles or beneath the pia-arachnoid membrane; but such effusions are rarely of abrupt origin. They are found in such well-known congenital and degenerative diseases as porencephalus, in which brain-substance has so disappeared as to leave a hole, which fills with fluid. In the aged, and sometimes in others suffering from forms of arrest of development, considerable shrinkage of the brain often occurs, and serum takes the place of the atrophied and flattened convolutions, so that the brain is found œdematous and wet. Such effusions are simply compensatory, and are never of sudden origin; but a patient dying acutely from some other cause and effusion being found, the conclusion is reached that the death is due to serous apoplexy. In nephritis a sudden form of uræmic coma or apoplexy does certainly occur, and œdema of the brain may be present in such a case, just as we may have œdema of the lungs or of other organs, although the cerebral symptoms may in reality be more dependent on changes in the composition of the blood than on the œdema. Such an attack is perhaps the nearest approach to a general serous apoplexy. The treatment for such cases should be with the view of relieving the kidneys and blood, and not that for true apoplexy from either the breaking or the occlusion of vessels: remedies which would be contraindicated in a genuine apoplexy might be called for, as, for example, active cathartics, diaphoretics, bloodletting, digitalis, caffeine, etc.

[1] *Journ. Nerv. and Ment. Dis.*, Aug., 1887.

[2] *A Treatise on Apoplexy, etc.*, New York, 1873.

The occurrence of congestive apoplexy has been both affirmed and denied; by some entire chapters are devoted to its consideration, while by others it is regarded as only a part of other diseases, or as rare. Autopsies are unreliable, owing to the changes which take place with death. The clinical and pathological evidences, however, are in favor of the occurrence of what may be termed active and passive congestion of the brain: in the former too much blood is pumped too rapidly into the arteries; in the latter too little blood leaves the veins, and leaves too slowly, the result in either case being widespread capillary engorgement. I need not here consider the etiology of these forms of congestion. Diseases of the heart and of the vessels are among the most common causes. When extreme congestion is rapidly induced sudden or at least speedy abolition of consciousness —that is, congestive apoplexy—may ensue. Usually this term, "congestive apoplexy," is applied to the affection of active type occurring in the plethoric. Occasionally convulsions accompany congestive apoplexies, and frequently, if they do not terminate fatally, delirium and fever are present for a time. The sudden loss of consciousness usually follows more or less serious symptoms of cardiac, vascular, and brain disturbance, such as rapid action of the heart, throbbing vessels, headache, fulness and heat in the head. Some of the patients who recover from the seizure are left for a time with more or less marked loss of power on one side of the body—a temporary monoplegia or hemiplegia —which has led to scepticism as to the cases being simply congestive, it being held rather that small extravasations may have occurred.

Congestive apoplexy may be, and probably usually is, accompanied by minute hæmorrhages or diapedesis of the red blood-corpuscles. The treatment of congestive apoplexy is the same as that of some, but not of all, cases of the true hæmorrhagic attacks. As the symptoms are commonly active in type, the remedial measures should in like manner be active: bleeding local or general, cathartics, bromides, and ergot should be unhesitatingly employed, whereas, as will be seen, the use of such remedies in massive hæmorrhages is sometimes not only uncalled for; but may be absolutely contraindicated. It is not, however, within my province in the present article to go into a full discussion of hyperæmia of the brain, but it is necessary to be borne in mind for the differential purposes both of diagnosis and treatment.

Congestion of the brain of the passive or venous variety must not be confounded with either congestive apoplexy of the active type or with intracerebral hæmorrhage, or treatment will go astray with resulting injury to the patient. Such venous hyperæmia is usually due to diseases of the heart or lungs, to thrombosis of the sinuses, or to mechanical interferences with the circulation, and the treatment insti-

tuted must be based upon a consideration of the pathology of the disorder. In such cases Niemeyer recommends venesection or leeching if the obstruction cannot be removed, but first attention must be paid to the removal of the cause.

Lidell considers congestive and serous apoplexies as belonging to the same class, and gives a number of cases with autopsies in which both congestion and œdema were present, and others in which either hyperæmia alone or œdema alone was found. Many of these cases were in chronic alcoholics, in whom not only disease of the kidneys was present, but the brain and its membranes were in a chronic state of deterioration. Such cases correspond closely to those to which I have already alluded as having either compensatory effusions or nephritic œdemas, or perhaps a combination of both. Besides nervous, serous, and congestive apoplexies, and the sudden attacks occurring in rheumatism and gout, other states of insensibility, which may more or less closely simulate the apoplexy which chiefly concerns us at present, result from such affections or conditions as sunstroke, drunkenness, epilepsy, opium, other narcotic poisons, syncope or fainting, trance, catalepsy, coma due to ventricular effusion, to fractures, or to brain-poisoning by gases or anæsthetics. Of course in a therapeutical article it will not be possible to go into a discussion of these varieties of insensibility and their diagnoses. The symptomatology of most of them has been considered under their own appropriate heads, but they are referred to for the reason that prompt and correct diagnosis is at no time of more importance for judicious treatment than when the physician is confronted by an insensible patient. He must decide not only what he has before him, but do so quickly if his services are to be of any value, and in order that he may come to speedy decision correctly the numerous affections which simulate and counterfeit each other must be before his mind.

Dismissing further consideration of these numerous forms of insensibility, I will now treat of apoplexy due to hæmorrhage into the brain, and also of those forms of apoplectic seizure which are the result of embolism or thrombosis. Much that can be said of the treatment of hæmorrhagic cerebral apoplexy is equally applicable to embolism and thrombosis. All that is said in the main body of this article should be regarded as distinctly relating to the hæmorrhagic variety of apoplexy: in its concluding portion the differences in treatment necessary to be made when the probabilities are in favor of embolism or thrombosis will then be briefly stated.

It is a question of first interest in connection with the treatment of these three states, so similar although due to different lesions, to know whether they can with sufficient clearness for therapeutic purposes be diagnostically separated. The differentiation is sometimes

one of extreme difficulty, and it has been declared by high authority to be frequently impossible. It can be made with an approach to certainty, and will be of the most importance when the question of such operations as trephining or ligating the carotid artery, or such active and positive measures as bloodletting or windlassing the extremities, may depend on the decision. Etiology often assists in the determination. Age is in favor of either hæmorrhage or thrombosis; comparative youth of embolism; disease of the cardiac valves, particularly if recent, points to embolism, and old kidney disease with hypertrophy of the heart to hæmorrhage. Thrombosis has usually a syphilitic history at its basis, or occurs with the arterio-capillary degenerations of a senile type; but such degenerations are of almost equal significance for hæmorrhage or thrombosis. An attack of embolism is usually of maximum severity almost from the first. Hæmorrhage comes on abruptly in many cases, but its signs and symptoms increase in severity as the blood continues to ooze and spread. The onset of thrombosis is generally more gradual than that of hæmorrhage or embolism. Convulsions and spastic states are more common in hæmorrhage. Hæmorrhage is by far most frequent in the capsular and ganglionic regions of the brain. Embolism attacks both cortical and intracerebral vessels, and one almost as frequently as the other. I cannot, however, go fully into this differential diagnosis, which belongs to other works, but will pass at once to the consideration of the treatment of cerebral hæmorrhage. Even this is a difficult subject to handle concisely—among other reasons because of its local varieties. A consideration of the localization of an intracranial hæmorrhage must to some extent influence prognosis and the activity of treatment, and a local diagnosis should therefore, when possible, always be made.

Hæmorrhages limited to such regions as the cerebellum, the oblongata, the pons, and the crus cerebri have often been recorded. A cerebellar apoplexy is, as a rule, serious and threatening, largely because of the parts which it invades either directly or by pressure. A hæmorrhage into the right or the left cerebellar hemisphere, if restricted to these parts, might be recovered from, and does not necessarily show any localizing symptoms of importance, but those due to invasion or pressure will be paralysis of various cranial nerves given off from the pons and oblongata, and probably incomplete paralysis of the limbs of the opposite side. Among common general symptoms of cerebellar hæmorrhage anywhere situated are vomiting and sometimes retraction of the head and neck with occipital headache. A limited hæmorrhage in one cerebellar hemisphere may sometimes cause absolutely no symptoms. A hæmorrhage, as any other lesion of the middle lobe of the cerebellum, has cerebellar titubation for its distinguish-

ing symptom. A cerebellar hæmorrhage sometimes breaks into the fourth ventricle, causing the same symptoms as a pons-oblongata apoplexy. If the middle or lateral cerebellar peduncle is invaded, intense vertigo and forced rotation of the head will be present.

Hæmorrhage into the pons or into the oblongata is of course a most serious lesion, and usually calls for no treatment, owing to the rapid induction of fatal symptoms. Convulsions are very frequent in lesions of the pons, and the paralytic symptoms will of course vary according to the extent of the lesion. Marked pupillary, respiratory, and temperature phenomena are usually present. When a hæmorrhage of this kind is suspected absolute rest is the only treatment, and any efforts to administer remedies or to try measures which cause the patient to be moved will probably do more harm than good. A hæmorrhage into the cerebral crus, while not as serious as one into the pons or oblongata, should be treated practically in the same way—namely, by carefully letting the patient alone. It will be most likely to cause paralysis of the third nerve on one or both sides, and of the limbs on the side opposite to third-nerve lesion if the latter is unilateral. Various anæsthetic and other symptoms might be present according to the extension of the lesion.

Meningeal hæmorrhages may occur in almost any location, although they are most frequent, whether traumatic or otherwise, from lesions of the middle meningeal artery, and these are commonly associated with fracture. Meningeal hæmorrhage wherever found may be either supradural, subdural, or subpial, although the last is much less common than the first two. The recognition of supradural and subdural apoplexies is of the utmost importance, because they are more amenable than any other forms of intracranial hæmorrhage, and indeed than almost any other active intracranial lesion, to surgical interference. When considering trephining for these hæmorrhages brief reference will be made to their symptomatology. Fortunately, they can be diagnosticated with considerable accuracy even in the absence of external evidences, although these, fortunately also, are most frequently present.

When the treatment of hæmorrhagic cerebral apoplexy is discussed it is chiefly, however, with reference to those varieties which are known as intracerebral. Such a hæmorrhage may take place anywhere within the cerebrum, but commonly the effusion is into or or near the great ganglionic masses. As a rule, it does not start either in the caudate or lenticular body, but, as Gendrin and Charcot have shown, just in contact with the external surface of the latter. Such a hæmorrhage forces its way right and left, and sometimes breaks through the ganglia and internal capsules and inundates the ventricles. From any given attack of intracerebral apoplexy the patient may possibly make

at least a partial recovery if this ventricular invasion has not occurred, and therefore the therapeutics of cerebral hæmorrhage is not without hope.

At the beginning of this article the symptoms of such an apoplexy were briefly stated, but in order to emphasize them they may be repeated here at greater length, as given in a monograph by the writer.

They are at the time of the apoplexy chiefly "loss of consciousness, more or less complete according to the extent of the hæmorrhage; stertorous respiration, sometimes, so far as as the mouth is concerned, one-sided, sometimes also Cheyne-Stokes; temperature at first lowered or afterward rising; pulse sometimes slow and full, sometimes weak and intermittent. Conjugate deviation of the head and eyes may be present, but it is not invariable; it is usually away from the side of the paralysis. It is not infrequently somewhat difficult to determine the full extent and character of the paralysis and loss of sensation, if this also be present, in these cases of apoplexy. Careful inspection of the face, however, will usually show some drooping on the side of the paralysis, and some pulling to the other side. Watching the limbs, the unparalyzed members will be seen to be used by the patient occasionally. The paralyzed extremities when taken hold of are usually limp and offer no resistance, while a certain amount of resistance is offered by the limbs of the other side even though the patient may be unconscious. My experience has shown me that cases of even somewhat extensive extravasation into the capsules and ganglia differ considerably in the amount of paralysis produced. A fuller knowledge of intracerebral localization may eventually throw light upon these differences. In general terms the paralysis of the limbs is usually much more complete than in cases of cortical lesion."[1]

The prophylaxis of apoplexy dependent upon cerebral hæmorrhage is chiefly the treatment of underlying constitutional conditions or diseases and the avoidance of certain particular exciting causes of an attack. Patients threatened with cerebral hæmorrhage in the majority of cases have chronic disease of the blood-vessels, and this in its turn is dependent upon or associated with diseases of the kidneys and heart. Arterio-capillary fibrosis with miliary aneurisms are frequently found in apoplectic cases, as well as chronic nephritis and cardiac degeneration, which has led to hypertrophy and dilatation. Great attention should therefore be paid to nutritive processes and to the functions of the kidneys and heart.

Diet is in such cases of the greatest importance: food should be of a nourishing character, but light and easily digested, and too much of the nitrogenous kind should be prohibited. The mistake

[1] "Cerebral Localization in its Practical Relations," *Trans. of Congress of American Physicians and Surgeons*, 1888.

should not be made, however, of putting such patients upon too low a diet. Hæmorrhages, it is well known, are likely to occur in anæmia, leukæmia, chlorosis, and other diseases of lacking or impoverished blood, and it is important to steer between the two extremes of insufficient food on the one hand and over-supply of improper food on the other. Both extremes will assist in the production of arterial degeneration and in the maintenance of chronic inflammatory and degenerative affections of the kidneys and heart,

The liver, stomach, and bowels should be kept as free from disorder as possible. Constipation should not be allowed, but frequent active purgation should be avoided. Preparations containing such drugs as podophyllin, aloes, strychnine, and belladonna, or cascara compounds, will be found of particular value in many such cases. Patients threatened with apoplexy should be advised moderate exercise, as sedentary habits, particularly if associated with over-eating or drinking, unquestionably aid in the development of nephritis and arterial degeneration.

The functions of the skin and the kidneys should be carefully looked after in accordance with the rules laid down in other portions of this work. Lukewarm baths are of value; but while it is of importance to keep the skin in good working condition, it should not be forgotten that either hot or cold baths may be a source of danger in patients with rigid blood-vessels and organic degeneration of the heart; great extremes of temperature and sudden transitions in bathing should be avoided.

The abuse of alcohol is undoubtedly a potent factor in producing and increasing chronic constitutional conditions which lie at the root of apoplectic attacks. It should therefore either be avoided altogether; or used with the greatest moderation under medical direction, as occasionally small quantities of alcohol seem to be valuable in sustaining the action of the heart and improving the digestive processes.

Overwork, and particularly over-worry of the brain, should be guarded against. While vascular degenerations rarely result from pure intellectual labor, overwork of any kind which tends to flush with blood the cerebral vessels is particularly dangerous when these vessels are diseased from age or special causes. The worries and embarrassments which often go with hard cerebral labor are more harmful than the work itself. Worry is begotten of overwork, and worry means friction and maladjustment of the cerebral powers.

Certain immediate exciting causes of apoplectic attacks may be escaped when—as, however, is seldom the case—enough is known about a patient to apprehend the occurrence of an attack. Straining at stool, violent coughing, sudden exposure to extreme cold, bending over, and constriction of the neck or trunk with tight clothing, all have some influence in the induction of an attack of hæmorrhage. Violent action

of the heart should be prevented or as speedily as possible controlled by rest or medicinal remedies.

Some of the old authorities on apoplexy, as Niemeyer, Tanner, and Lidell, advise special measures for the prevention of apoplexy by changing certain morbid states of the system. Most of these measures are of doubtful general value, and yet almost any one of them may be of some service in a chosen case. For states of general plethora, as prophylactic measures, saline purgatives, the bromides, bloodletting, cold to the head, and the frequent use of derivatives to the extremities have been recommended. Cases are occasionally seen in which such advice is of value, but in spite of the popular view hæmorrhagic apoplexies are more frequent in individuals who present no signs of plethora, but rather the reverse.

At various times special remedies have been recommended as of particular value for cerebral hyperæmia, and therefore as a preventive of apoplexy. Lidell, for example, with certain French observers whom he quotes, strongly advises the use of arsenious acid in doses of about $\frac{1}{20}$ grain, taken three times a day after meals. If such a remedy has any value, it is probably that which arises from its tonic and building effects on the nervous system.

One of the most important matters in the prophylaxis of apoplexy is the careful management of the forerunning diseases of other organs than the brain. Bright's disease, hypertrophy and dilatation of the heart, or valvular lesions must receive careful attention. Aconite or veratrum viride may sometimes be employed, or, on the other hand, small doses of digitalis or strophanthus may be needed. In embolic apoplexy, accompanying endocarditis and valvular disease may require attention. It is necessary in some of these cases to regulate and equalize the circulation at the same time that the patient's general strength is sustained. Digitalis, either alone or associated with drugs such as strychnine or nux vomica, may prove beneficial, and remedies to act upon the skin or upon both the bowels and kidneys may be required for the double purpose of reducing blood-pressure and directly relieving the kidneys.

If called to see a patient stricken with insensibility, and by exclusion or otherwise the diagnosis of intracerebral hæmorrhage has been made, what should be done? In the first place, the patient should be kept as quiet as possible. The amount of hæmorrhage and consequent brain-destruction may be augmented by moving the patient about, lifting him up and down, and turning him over too frequently. The head and shoulders should be slightly raised, but flexion and constriction of the neck should be avoided. Even the physician should be unusually careful in his method of handling and investigating the patient. The clothes should be loosened, so that unusual pressure will

not be exerted anywhere upon the blood-vessels or internal organs. It is sometimes better to cut and destroy clothing rather than to move the patient unnecessarily in removing or loosening it.

Sometimes treatment of the greatest simplicity is overlooked while laboriously but vainly striving to help a patient; and this remark is particularly applicable to one of the most useful of all measures for the relief, and it may be the salvation, of a patient in a severe apoplectic attack. Stertor is one of the danger-threatening phenomena of apoplexy. It is usually regarded as connected in some more or less mysterious way with hæmorrhage into the brain and conditions of arterial tension. Bowles[1] in a recent work on stertor and apoplexy has made some exceedingly valuable practical suggestions with reference to the nature of stertor and its relief. He criticises the views of Strumpell, Nothnagel, and the authors in general who agree with them as to the value of venesection, enemata, and purgatives for apoplexy. He believes that, after all, it is the suffocative symptoms which are relieved by bleeding, and suggests what is certainly a much simpler if equally efficient means of giving relief—namely, turning the patient on his side. I will briefly summarize his views, the practical value and easy application of which are at once evident. On several occasions I have tested their value, although I am inclined to believe that he is too sweeping in his claims for the efficacy of his plan in all cases:

The term "stertor" is descriptive of the sounds in the throat, mouth, or any part of the air-passages produced by the movements of the air during respiration and occurring in apoplectic and like conditions. Bowles distinguishes between several varieties of stertor as the nasal, buccal, palatine, pharyngeal, laryngeal, and mucous. He holds that the stertor of the apoplectic state may be equal in danger to the crowing of the croupy child or the stridor arising from the pressure of a thoracic tumor.

"The accident which determines whether 'the stroke' be or be not accompanied by stertor," he says, "is in most cases due to the patient's happening or not happening to be on his back; or should he exhibit stertor while on his side, there must be some derangement of the ordinary relations of the pharynx, such as the chin being too near the sternum, the existence of a local œdema, long uvula, large tonsils, mucus in the air-tubes, pressure from without, or indeed anything which narrows the respiratory channels or vibrates in their course."

His most important conclusions are that the three forms of stertor which have most connection with the apoplectic state are the palatine, pharyngeal, and mucous; that these three varieties, whatever their remote cause, are the immediate result of a local mechanical condi-

[1] *On Stertor, Apoplexy, and the Management of the Apoplectic State*, by Robert L. Bowles, M. D., F. R. C. P., Lond.

tion—a condition which may always and at once be changed to the great relief of the patients, and sometimes to their permanent recovery; that it is necessary to keep the patient on one side, that that side should not be changed, and that the paralyzed side should be downward.

The question of the use of bloodletting in the treatment of apoplexy is old, and even yet to some extent unsettled. Formerly it was the great resort, and the practitioner who did not bleed his apoplectic patient was regarded as almost guilty of malpractice, while now it is so rarely done that nine-tenths of the practising physicians have probably never bled an apoplectic patient. The chief reason usually assigned for bleeding is to relieve blood-pressure, and especially to diminish intracranial pressure; but Bowles shows that this increase of pressure is often apparent rather than real, and is due to mechanical causes. Some cases of hæmorrhagic apoplexy are probably at the same time instances of general cerebral congestion, and this accompanying hyperæmia may be benefited by bloodletting. Bleeding has been advocated to promote absorption and to exert some sort of styptic action, but little dependence is to be placed on it for such purposes.

Bleeding may do harm in various ways. Although the affection to be treated is an extravasation of blood into the brain, the general condition of the system may be one of anæmia. It is contraindicated when the pulse is soft and the action of the heart is weak and irregular. Position should always be tried first. When bleeding is resorted to, it should be done efficiently, but only in carefully selected cases, for patients, for instance, who, after the side position has been tried, present the general symptoms of cerebral hyperæmia, such as over-acting heart, throbbing vessels, full strong pulse, and flushed or turgid face.

Hughlings Jackson refers to the fact that post-mortem appearances in bodies of patients who have died early after cerebral hæmorrhage usually show great engorgement of every part of the lungs, and suggests that bleeding might serve to relieve the embarrassment of the venous circulation, although he does not have much hope of this.

Just as in hæmoptysis styptics and astringents are held to be of value, so no reason would seem to exist why they should not be in cerebral bleeding, yet few recommend such remedies for the latter affection. For pulmonary hæmorrhage a large number of such drugs are still frequently employed, including gallic acid, sulphuric and other mineral acids, erigeron, ergot, preparations of lead, zinc, etc. In some cases these might be worthy of a trial in cerebral hæmorrhage, but the reasons against their use, on the whole, are stronger than those in their favor. Loomis says that it has never seemed to him that styptics or astringents have any control over bronchial hæmorrhage. He relies

rather upon remedies such as aconite and opium, using the former when the pulse is full and strong, and the latter hypodermically when it is weak.

Dawbarn,[1] who refers to this advice of Loomis, speaks of aconite "as bleeding the patient into his own veins," but advocates what he regards as a more efficient way of doing this. "For dangerous and unreachable bleeding anywhere," and therefore for cerebral apoplexy, as well as for hæmorrhage into the lungs, stomach, kidneys, or other organs, his plan is to collect a great portion of blood elsewhere than at the bleeding point until time has been given for a new clot to form, and then slowly allow it time to re-enter the circulation. This sequestration, he holds, if carried to the extent of causing a feeling of faintness, must diminish the blood-pressure at the bleeding point and thus conduce to clotting. Dawbarn argues in favor of the Spanish windlass in many cases of apoplexy, but believes that such local stagnation is not free from danger in careless hands. The limb should be watched and kept well warmed, and the constriction should not be maintained long enough to produce gangrene. The plan is simply to knot a towel or handkerchief around the limb, or if necessary all four limbs, at the junction with the body, and then to twist with a stick until most of the blood is prevented from returning to the trunk.

Dr. William Gilman Thompson,[2] as the result of experiments in the Hoagland laboratory, believes that the strapping of the large veins in the extremities to prevent venous return during pulmonary hæmorrhage has undoubted and immediate effect in lessening the hæmorrhage, and also that such procedure would doubtless tend to relieve extravascular cerebral pressure, but would simultaneously lessen the intravascular pressure, and the latter would be affected to a greater degree and more promptly, tending to give the hæmorrhagic blood time to clot.

"The reason for this would be that the extravascular pressure would be dependent somewhat upon conditions of absorption and osmosis, which would act more slowly than the almost instantaneous effect of withdrawing blood from the heart by damming it back in the extremities."

Dawbarn contends, therefore, that whenever there is bleeding enough to threaten life, and not within reach of direct pressure nor of the artery clamp, our main reliance should be the tourniquet or windlass, generally placed upon all the limbs. He makes the following interesting suggestion, which we will give in his own words, which are certainly put in a very practical shape:

"I need hardly say that promptitude and the ounce of prevention may here save a pound of blood. Given a case where bleeding from

[1] Dawbarn, New York *Med. Record*, vol. xli., No. 1, Jan. 2, 1892.

[2] Letter to Dr. Dawbarn in *Med. Record*, Jan. 2, 1892.

the lungs or stomach has already occurred, or given a patient where family history, atheroma, high living, and attacks of cerebral congestion (perhaps with one or two slight strokes already sustained) point to apoplexy as the probable end of the story, we should make it a rule to show the relatives, privately, how to make and use the windlass. As to apoplexy, we should say to them: 'If ever Mr. A—— becomes suddenly unconscious, then, unless his face is pale and his pulse weak, put on the windlass instantly, tightly enough to make the limbs swell. Do this even before you send for the nearest doctor. Do not leave these bands on longer than an hour.'"

The use of derivatives and of hot applications to the extremities is a treatment for apoplexy as old as bloodletting, and one perhaps of more practical general value. Hot water or mustard plasters may be applied to the feet, but care should be taken that the patients are not scalded or blistered in this way, as their insensibility may prevent them from recognizing painful impressions. The great cupping-glass apparatus known as Junod's boot has been recommended in cases of apoplexy, but usually Junod's boots are not to be had, and their efficiency has not been so proved as to justify the average physician in keeping them on hand. The use of ordinary derivatives, however, has something to justify it, and in its favor is the fact that it is a method likely to be appreciated by the friends and family of the patient.

Cathartics, like bloodletting, act to reduce arterial pressure, and they may be used both for this reason and to put the intestinal tract in a more healthful state, and to obtain a derivative effect in this way. Croton oil is an old and good remedy still much in vogue in the treatment of apoplexy. Hughlings Jackson states that he never prescribes any medicine but croton oil by the mouth. Usually two or three drops with a little sweet oil are placed on the tongue. Croton oil has the advantage of rapidity and certainty of action and comparative facility of administration. Elaterium may be used instead of croton oil.

The administration of cathartic medicines by the hypodermic method would be a decided help in some cases of apoplexy, as this could be done when the patient could not swallow, and the movement required in order to give an enema, which might add to the danger of the patient, could be avoided. I do not, however, know of any practical method of doing this.

Stimulants are to be resorted to when cardiac and respiratory paralysis is threatened, as shown by feeble heart, weak and rapid pulse, Cheyne-Stokes breathing, and similar phenomena. The stimulants used may be either local or constitutional. Of the former might be mentioned the direct application of cold water to the chest or the nape of the neck, irritation of the skin by mustard or other local irritants, or

even the use of the faradic brush to the hands or feet. Ammonia may be given either by the nostrils, by hypodermic injection, or even internally. Some preparation of musk, or even whiskey or other alcoholic stimulant, may be given in whatever way is most convenient. As a rule, practitioners do not resort to methods of this kind, which usually do but little good, and yet cases occasionally are seen in which consciousness is restored and recovery from an apoplectic attack brought about by such measures.

Ergot is a remedy which has several theoretical considerations in its favor, but certain others which are decidely against its use. Wood, for instance, considers that by increasing blood-pressure its tendency is rather to do harm than good in apoplexy, although it may be advantageously used in cerebral congestion.

Such accompanying phenomena as convulsions may require particular attention. Bastian has recorded a case in which an injection of 30 grains of chloral into the rectum appeared to stop the convulsions. Vomiting may also demand especial attention, as it, like convulsions, may serve to increase the hæmorrhage.

The treatment of an apoplectic attack cannot be entirely separated from a consideration of the causes and conditions which occasion it. Frequently it occurs in a patient suffering from nephritis and its accompaniments, such as hypertrophy or dilatation of the heart, with rigid arteries and abnormal urine. In such a case, although the attack may not be a uræmic but a true apoplectic seizure, remedies should be directed both to the relief of the apoplexy and of the other conditions. If a patient has had one apoplectic attack from which he partially recovers, he should afterward pay strict attention to hygiene, remembering the likelihood of another attack. The remarks on prophylaxis are here applicable. Life should be kept as free from hurry and care as possible; food should be sufficient, but easily digested; and the bowels and kidneys should be regulated as absolutely as possible.

At this time, when trephining is so frequently resorted to, the operative treatment of several forms of hæmorrhagic apoplexy is well worthy of brief consideration. Some of the most brilliant results in intracranial surgery have been obtained from operations for intracranial hæmorrhage, although it is true that the successful cases have been unusually traumatic in origin and extracerebral in position. I have elsewhere considered this subject at length.[1] Intracranial hæmorrhage may be either supradural, subdural, cortical, subpial, or intracerebral. Supradural and subdural hæmorrhages are almost always the results of injuries, and when their existence can be clearly made out trephining and removal of the clot may often be successful, a fracture when pres-

[1] "Cerebral Localization, etc.," *Trans. Congress Am. Phys. and Surgeons*, 1888.

ent being of course at the same time treated. Such hæmorrhages are most frequently from the branches of the middle meningeal arteries. Deaver[1] has reported several interesting operations of this kind, all the cases being of traumatic origin. The chief symptoms of supradural hæmorrhage are dilatation of the pupil, usually on the side of the apoplexy, and contralateral paralysis, when, as is usually the case, the bleeding is over the motor area. Among general symptoms are complete or partial unconsciousness, often giving way for a time to a conscious or lucid state, stertorous or Cheyne-Stokes breathing, variable pulse, dependent upon the extent and severity of the hæmorrhage. Often either legs or arms or both are spastic, and jerking movements or even general spasms may occur.

The symptoms of subdural or intrameningeal hæmorrhage do not differ much from those of the extradural variety; the general symptoms are certainly much the same. Owing to the frequent bruising and tearing of the brain surface cortical or Jacksonian spasm is more likely to occur, although the convulsions with either variety of hæmorrhage may be what are termed dural in character—that is, more or less general—and both clonic and tonic, but with a predominance of the clonic element. Cases have been recorded of clots over the motor area, with or without a history of injury, causing rhythmical motions of the other side of the body. The diagnosis of meningeal hæmorrhage should therefore be carefully made with operative treatment in view. Subdural or intrameningeal hæmorrhages are nearly always also cortical, but occasionally a hæmorrhage is poured out beneath the inner membrane, and may be particularly classed as cortical or subpial. Not a few of the cases of spastic or epileptic hemiplegia in children begin in this way, and operation promptly performed might sometimes prove a saving measure.

Even in the absence of external evidences of injury successful trephinings for supra- and subdural hæmorrhages have been reported. Such operations should be performed promptly, the localizing diagnosis having been made. The localizing rules are the same as for other lesions, except that it is necessary to bear in mind the symptoms which result from involvement of the dura mater as well as of the pia-arachnoid and cortex.

Even for intracerebral hæmorrhage—that is, where the extravasation has taken place within the substance of the cerebrum or in its ventricles—the question of trephining to remove the clot is worthy of some consideration. In one or two cases operation has been successfully performed for ventricular hæmorrhage, and the fact that recovery has occurred in rare cases of primary ventricular hæmorrhage is a reason for considering the practicability of trephining in such cases. Such

[1] *Annals of Surgery*, June, 1891, and *Journ. Nerv. and Mental Dis.*

operations have been advocated by Gray,[1] Dana,[2] Lanphear,[3] the writer,[4] and others, while strongly opposed by some authorities. In 1883, Macewen[5] removed a clot from the white substance of the motor subcortex. On several cadavers I made experiments to see if intracerebral extravasations could be reached by trephining. This could be done by entering the temporal lobe low down and well back, so as to avoid the Sylvian fossa and the island of Reil. According to Dana, in order to reach a common form of ingravescent hæmorrhage the best place to trephine would be a little below and in front of the parietal eminence. The surgeon should then explore downward and forward, care being taken not to injure the terminal branches of the Sylvian artery, which are in this neighborhood. In cases of ingravescent apoplexy surgical interference, if undertaken, should be before the blood broke into the ventricles. This, Dana believes, can be determined by the sudden increase in the severity of the symptoms, and, if the blood is poured in rapidly, by contractures on the paralyzed side.

My own observations show that when a hæmorrhage reaches the ventricles, the unconsciousness becomes, if possible, more profound, the complete unilateral paralysis becomes general, all sensory response is absent, tremulous and spasmodic movements affect both sides of the body, and the Cheyne-Stokes type of breathing persists. Various practical questions arise with the subject of trephining for intracerebral clots, particularly when deeply situated. It has been suggested, for instance, that it might be impossible to remove the extravasation on account of its having formed a firm coagulum. It does not always do this. Within one week I saw two cases of intra-encephalic hæmorrhage, in one of which the cavity was filled with a firm clot, and in the other the blood was entirely fluid, although the patient had been dead more than twenty-four hours. The reason of this difference I do not know, but in hæmatocele, no matter where situated, when not in contact with the air the blood is sometimes coagulated and sometimes not. Even though blood is coagulated, it might in some cases be removed by carefully enlarging the opening made by the knife to reach the seat of the hæmorrhage with flat retractors, and then extracting the coagulum in fragments with forceps or spoon. The bleeding in cerebral hæmorrhage probably ceases because of the retraction of the vessel and the forming of a small coagulum in it, but of course the danger of producing a fresh or renewing an old hæmorrhage should be considered. If such operations are resorted to, care should be taken not to move the patient more than is absolutely necessary.

[1] *Annual Univ. Med. Sci.*, 1891, vol. ii.

[2] *Journ. Nerv. and Ment. Dis.*, vol. xv. No. 10, Oct., 1890.

[3] *Am. Journ. Surg. and Gyn.*, vol. ii. No. 6, Jan., 1892.

[4] *Trans. Cong. Am. Phys. and Surg.*, Sept., 1888.

[5] *Lancet*, London, Aug. 11, 1888.

Victor Horsley,[1] at the International Medical Congress, Berlin, 1890, made the bold suggestion that in hæmorrhage from the ventriculo-striate artery, the ordinary form of cerebral hæmorrhage, ligature of the common carotid artery should be performed. He advocates this heroic measure on the ground that position, bleeding, etc. are of little or no effect in checking the hæmorrhage, and that the consequences of the apoplexy, such as hemiplegia, and even death, vary directly with the number of fibres torn through by the hæmorrhage. He believes that the hæmorrhage can be checked by arrest of the carotid stream by ligature or compression. Experiments performed by him, in conjunction with Mr. Spencer, determined that ligature of the common carotid not only arrests the flow of blood from the ventriculo-striate artery, but in a few minutes also even from the middle cerebral. He believes that no serious effects are likely to result from the operation if asepsis is perfect. I am not aware that this suggestion has yet been carried out in practice. It should be done within three or four hours after the attack. Opposed to it is the great difficulty of determining that an apoplectic stroke is due to hæmorrhage or embolism, but in some cases the diagnosis can be made with an approach to certainty. According to William Gilman Thompson, already cited in connection with the paper of Dawbarn, ligating the carotid or the vertebral arteries has no very decided effect upon the amount of fluid contained in any of the cerebral tissues, while, of course, the pulsations of the brain cease and the intravascular cerebral pressure falls. In rare cases, where the diagnosis of the cerebral hæmorrhage is made with certainty and the patient is seen early, such an operation would be justifiable.

When a patient does not succumb at once or speedily to the apoplexy, after a period usually varying between twelve and twenty-four hours, a rise of temperature often takes place, or if recovery is not likely, the temperature may remain stationary or nearly so until death. In the cases which tend to recovery consciousness may begin to return with or before the febrile phenomena, which include in some instances delirium. The patient may complain of headache and of pain in the paralyzed limbs, and may be apathetic, gloomy, confused, or even semi-stuporous. It is commonly supposed that symptoms such as these are due to inflammation of the tissues in the vicinity of the clot, and it is just as well to direct the treatment with this idea. Local bloodletting to the temples or back of the neck is sometimes a useful procedure, as may also be the application of cold to the head by means of an ice-bag or wet cloths. The bowels should be kept gently opened, and the bromides, hydrobromic acid, chloral, sulphonal, and even opiates in moderate doses, may be used with advantage to allay the symptoms of excitement. For the cerebritis or meningitis calomel and other preparations of

[1] *Brit. Med. Journ.*, vol. ii., Dec. 6, 1890.

mercury may be given with the narcotics and sedatives. Calomel in minutely divided doses may serve to carry out several valuable indications.

Not much need be said of the treatment of apoplexy due to cerebral embolism as distinguished from that dependent upon hæmorrhage. To avoid such attacks the patient should be carefully guarded against everything that would disturb the circulation or heart-action. Any acute symptoms in the course of rheumatism, of the puerperal state—or of the various infectious diseases, such as scarlet fever, diphtheria, and influenza—which lead to endocarditis, should be carefully considered and treated. Venesection is not called for in cases of cerebral embolism; and stimulants and heart tonics may be temporarily of service, assisting in the establishment of collateral circulation. Little or nothing can be done in the way of removing emboli from the vessels; and unless collateral circulation is fully and freely established early, some softening of brain-tissue takes place, and this cannot of course be removed by treatment. Affections of the bladder and bowels, bed-sores and ulcers, and similar troubles, are present in cases of embolism, as in hæmorrhage, and must receive similar care. In the treatment of cerebral thrombosis it is highly important to bear in mind the enfeeblement of the circulation, resorting, if necessary, to nutrients and stimulants.

The use of oxygen has been recommended to tide the patient over an apoplectic attack, and it is conceivable that patients with dyspnœa and cyanosis, in which change of position has failed to correct the threatening conditions, may be sustained for a period or some of the effects of shock be removed by the inhalation of the gas. It is possible that in serious attacks of embolism, more than in either hæmorrhage or thrombosis, such a method of treatment might be useful. Cases of embolism of the pulmonary artery have been reported in which the patients were thus sustained until recovery was assured.

The treatment of the bed-sores and ulcers which are not infrequently left requires to be carefully considered. Such eschars sometimes occur on the buttock of the paralyzed side without any reference to pressure or uncleanliness; they are vaso-motor and trophic affections, dependent like the paralysis and other symptoms upon the apoplexy itself. Such sores or ulcerations require to be treated with poultices or alternate hot and cold applications and various antiseptic dressings. Among the remedies most useful are carbolized washes or carbolized oil, iodoform powder, and injections or applications of the peroxide of hydrogen. In a patient in the recovering stage from an apoplexy or during the hemiplegic period, particularly its earlier part, strict attention should be paid to the condition of the bladder and the bowels and to the effects of their involvement. Involuntary evacu-

ations both from bowels and bladder often occur, and, on the other hand, both bladder and bowels may be distended, injured because of paralysis of their walls. Catheterization or the use of enemata should be resorted to if necessary. If cystitis develops, or to prevent its development, the bladder should be treated both by external applications and by internal remedies, and if necessary it should be carefully washed out with antiseptic solutions.

The permanent symptoms usually left after an apoplexy are such as motor paralysis, anæsthesia, aphasia, and certain vaso-motor or trophic states in the paralyzed limbs. Little can be done by drugs to affect the lesions directly, although the iodides and ammonia preparations may be of some value for the promotion of absorption and in the improvement of the chronic disease of the vessels. Electricity, in the form of either faradism or galvanism, will prove of some service in restoring the limb to the highest degree that the brain lesion will permit. The paralysis is sometimes more pronounced than the lesion necessitates. No good will result, however, from prolonged and persistent treatment with electricity. Massage and Swedish movements are to be used on the paralyzed limbs with the same object as the electrical current—namely, to improve circulation and nutrition and attest how far improvement can take place. The aphasia which often follows an apoplectic attack can in some cases be improved by persevering training.

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## INTRACRANIAL TUMORS.

Intracranial tumors are of many varieties both as to structure and as to location, and as the only methods of treatment for these growths which offer any hope are surgical procedures and remedies for constitutional infection, it is necessary first to glance briefly at these varieties.

In the article on "Tumors of the Brain and its Envelopes," in the *American System of Practical Medicine*, by Dr. Lloyd and the writer, are presented in tabular form the pathological varieties in 100 cases of brain tumor, as follows: Carcinoma, 7; cholesteatoma, 1; cyst, 2; echinococcus, 2; enchondroma, 1; endothelioma, 1; fibro-glioma, 2; fibroma, 4; glioma, 16; glio-sarcoma, 1; gumma, 13; lipoma, 1; myxo-sarcoma, 1; myxo-glioma, 2; osteoma, 2; sarcoma, 15; tubercle, 13; unclassified, 16.

Gowers[1] groups intracranial growths in what he believes to be the order of their frequency, in six categories: I. Diathetic—tubercular and syphilitic; II. Sarcomatous—glioma, sarcoma, myxoma;

[1] *Diseases of the Nervous System*, p. 871.

III. Carcinoma; IV. Osteo-fibroid—fibroma, osteoma, osteo-fibroma; V. Miscellaneous—cholesteatoma, lipoma, vascular or erectile tumors, psammoma, neuroma; VI. Parasitic—echinococcus and cysticercus.

In the table of Lloyd and the writer, which was of selected cases, it happens that gliomata, gummata, sarcomata, and tubercular tumors are represented by nearly the same percentages. Gliomata and sarcomata rank a little ahead of the other two, but these numbers probably do not represent correctly the ratio of the different forms of growths. Gowers is more nearly correct when he says that, excluding syphilitic growths, tubercular tumors constitute more than half the number of cases, and gliomata and sarcomata together about a third, gliomata being rather more frequent than sarcomata; and thus the two groups, tubercular and sarcomatous, constitute about four-fifths of non-syphilitic tumors of the brain. Knapp,[1] to whom we are indebted for the most recent monograph on intracranial growths, a valuable contribution from an analysis of Bernhardt's 485 cases, of Birch-Hirschfeld's 314 cases, of Starr's 299 cases occurring in children, and of 40 personal cases, concludes that tubercle is the commonest form of intracranial growth; next the two connective-tissue formations, sarcoma and glioma, with their varieties; and next, with a long interval, gumma, cancer, and parasitic cysts, other forms being exceptional.

The varieties of tumor which offer the most hope of success from operation probably are, in the first place, the osteo-fibroid class, which includes the fibromata, osteomata, and osteo-fibromata, intracranial tumors which undoubtedly frequently result from injury to the skull, sometimes the traumatisms long antedating the earliest observed symptoms of tumor. Agnew places cysts and gliomata next to fibromata. To empty a cerebral cyst is usually, however, of little use, for the simple reason that it will fill again. Opposed to operation upon a glioma is the fact that it is nearly always infiltrating in character. Probably the cases known as fibroid-gliomata, which are rare, and are the most distinctly separable from the brain-tissue proper, are for this reason more operable. In favor of operation on gliomata is the fact that they are not usually multiple. On the whole, if the location and nature of a gliomatous tumor could be made out and its size and region did not prohibit operation, trephining for its removal would be justifiable, because of its incurability by medication and of the possibility of preventing its further spread by operation; but brilliant success cannot be hoped for from operations on tumors of this character.

The weight of opinion seems to be against operation for sarcomata and carcinomata, whatever may be their varieties, the opposition being based upon their tendency to infiltrate, to be multiple, and to recur;

[1] "The Pathology, Diagnosis, and Treatment of Intracranial Growths," *Fiske Fund Prize Dissertation*, No. xli., Boston, 1891.

but a few special words may be said about the varieties of sarcomata. The advisability of operating depends largely upon the situation and probable isolation of the growth. Recently I saw two cases which illustrate the points necessary to make in coming to a conclusion. One was a patient in whose case amputation of the arm at the shoulder-joint had been performed because of an osteo-sarcoma, but who a few weeks later, after short initial symptoms, developed a gradually augmenting hemiplegia, with some associated hemianæsthesia, and in whose case a careful study indicated the strong probability of sarcomatous infiltration of the internal capsule and corona radiata of the cerebrum. In such a case operation would be clearly inadmissible, even though the growth were presumed to have well-defined boundaries. The other case was that of a man who, previously in good health, was seized two years before coming under observation with an attack of unconsciousness, associated with spasm. He had had several similar attacks, some of them positively epileptic in character, others simply of dazing or vertigo; tinnitus was the only symptom preceding the first attack, and this had continued and increased and was associated with some failure of hearing. Decided tenderness began to show itself in a crescentic and augmenting area above the left ear, gradually became more and more decided, and slight weakness was soon present in the right upper and lower extremity. The patient had received two or three severe blows on the head several years before. The diagnosis of osteo-sarcoma or osteo-fibroma was made and operation advised.

Notwithstanding, then, the tendency to infiltrate, to be multiple, and to recur, when the desperate, painful, and inevitably fatal character of these affections is considered, if a sarcomatous tumor can be localized in bone or membranes or in both, operation is not only justifiable, but in the early stages of the affection it should even be urged. No harm can be done if the operation is skilfully and carefuly performed, and the patient may at least be saved some suffering and be given a longer lease upon life. In this case, as in other cases of brain tumor, operation if it is done at all should be done early.

Occasionally trephining should somehow be performed for syphilitic growths, because such growths occasionally resist the most active antisyphilitic treatment, at least one reason for which is that supplying blood-vessels have been obliterated by the advancing tumor, so that remedies can no longer reach the growth, and they therefore practically become inert foreign bodies. Authorities differ as to the advisability of removing syphilitic growths, but all are agreed that energetic medicinal remedies should be employed in the form of mercurials and iodides before interfering surgically.

It may seem strange to advocate the removal of tubercular tumors, and certainly such an operation would only be justifiable in the very

rare case in which the diagnosis of an insolated tyroma had been carefully made, and in which the evidence was against the existence of tuberculosis in other organs than the brain. Gowers says that "occasionally these growths (like bone disease) may be the sole lesion, and hence they are sometimes called 'scrofulous' tumors, but of their tubercular nature there is no doubt. They compress the brain tissue, which atrophies before the growth; they do not infiltrate like some other tumors. They generally occur within the cerebral substance, without connection with the membranes; very rarely a small growth springs from the pia mater. Now and then they spring from the dura mater, and merely compress the brain without invading it."

Cysts which are the remains of destroying lesions, such as clots, softening, gliomata, sarcomata, and the like, offer no inducements to operation. As in porencephalus and hydrocephalus, which are in fact cysts of larger size, the objection to operation is that the contents of these cysts are compensatory and protective, and that if operation is performed and the cysts are drained they will either fill again or harm may result from the disturbance of the balance within the skull. Multiple small tumors, such as the psamomata, cholesteatomata, and multiple cysts, such as cysticerci, are of course beyond the pale of operation because of their multiple character. Hydatid cysts may be between the membranes or even outside of the dura mater, although they are usually found deep in the brain: as hydatids are usually single, if they could be localized in an accessible area trephining might be considered.

Summarizing, it will be seen that, so far as the nature of the growth is concerned, in favor of operation are the single or solitary character of the growth; that it is not infiltrating, and not likely to recur; that it is not multiple; that it is not too large; and that appropriate remedies have been used thoroughly and without success.

Agnew[1] in his address before the American Surgical Association at the Congress of American Physicians and Surgeons, held in Washington in September, 1891, gives with comments a table of five operations done by Philadelphia surgeons for brain tumors. The results were not brilliant, although in one of the operations, by Keen, a tumor which weighed four ounces was shelled out of the brain, and the patient has since had great relief from spasms and pain, many of the destructive results produced by the tumor remaining. Dr. Agnew concludes as follows with reference to operation considered from the standpoint of the structure or nature of the growth: "If tubercular in character (and nearly one-half are of this nature, especially in young subjects), they are likely to be multiple, and consequently offer little prospect for successful operation, as the history of such cases

[1] *University Medical Magazine*, Oct., 1891.

proves. If the growth should be a sarcoma or a carcinoma, their magnitude, with the inherent tendency of such to infiltrate and disorganize the surrounding brain tissue, renders all attempts at extirpation uncertain, often improbable, and rarely successful. In Starr's collection of brain tumors, amounting to 300 in number, only 19 would have justified an attempt at removal. The cases which appear most amenable to operative interference are fibromata springing from the dura mater, cysts, and gliomata."

Of course, in view of what has just been said, the diagnosis of the nature of the growth becomes of prime importance, and unfortunately this is usually a matter of great difficulty. In some parts of the brain certain forms of growth are known to be more common; thus, according to Seguin and Weir,[1] the cerebellum appears most prone to cystic formations, often as secondary developments from a sarcomatous tumor. According to Knapp, in the cerebellum growths are more apt to be tubercular, and in the white substance of the cerebrum sarcomatous or gliomatous, while multiple growths are more commonly tubercular or syphilitic. The following remarks of the same author briefly summarize our knowledge, or rather our lack of knowledge, on this subject: "Certain other symptoms may give us some help. The discovery of a cancer or sarcoma in other organs may lead us to suspect a metastatic deposit in the brain. The presence of a marked cachexia strengthens this suspicion. Evidences of tuberculosis elsewhere, or of a tubercular diathesis, or symptoms of syphilis, may help us in our diagnosis. A denial of previous syphilis is of course of little value. The age of the patient may also be a guide, tubercle being especially common in young subjects. Heredity may throw a little light, especially with cancer and tubercle. So far as the actual symptoms of tumor go, they give comparatively little help. Frequent apoplectic attacks and a moderately slow progress are said to point to glioma."

Of course the location of a growth is of vital importance in deciding as to the probabilities of its successful removal. In a paper read before the Congress of American Physicians and Surgeons in September, 1888,[2] I fully considered this question, arriving at conclusions which are there stated as follows: "The lateral aspect of the prefrontal lobe, the entire motor area, the superior and inferior parietal lobules, and the upper temporal region can, of course, be attacked with the greatest facility. In the regions difficult yet possible of access lesions of large size and of displacing character will be more readily reached. The orbital surfaces of the prefrontal lobe can be reached and large displacing lesions removed by trephining low down in the frontal bone.

[1] *American Journ. Med. Sci.*, July, Aug., and Sept., 1888.

[2] *Trans. Congress Am. Phys. and Surgeons*, Sept., 1888.

In Durante's case the tumor removed occupied the left anterior fossa of the cranium. Almost the entire temporal lobe, with the exception of the parts bordering on the mid-brain, is accessible. The occipital lobes have been operated upon successfully. With care the great median fissure may be entered for lesions of the marginal convolutions and limbic lobe. The longitudinal sinus has been successfully plugged and ligated. The outskirts of the ganglia have been approached and the ventricles have been pierced. Even a tumor situated on the intracranial portion of the auditory and facial nerves can probably be reached and removed. Suckling and Jordan, Bennett May, Horsley, and Weir have looked during operation with the eyes of the flesh on the foramen magnum itself. Absolutely inviolable, then, are only the middle region of the base and its bordering convolutions, the corpora quadrigemina and pons oblongata."

Knapp[1] gives the most complete list yet published of operations for cerebral tumors. One of these tables includes 46 cases of trephining with removal of an intracranial growth; the other 26 cases of trephining in which a growth was not removed. He gives a summary of both of these tables, which, because of its value in assisting the physician to a decision as to operation, I will reproduce:

| Tumors of— | Recovered. | Died. | Unknown result. | Total. |
|---|---|---|---|---|
| Prefrontal region | 2 | 1 | 0 | 3 |
| Central region | 22 | 6 | 1 | 29 |
| Parietal region | 2 | 0 | 0 | 2 |
| Occipital region | 0 | 1 | 0 | 1 |
| Cerebellum | 2 | 3 | 0 | 5 |
| Unknown location | 2 | 4 | 0 | 6 |
| Totals | 30 | 15 | 1 | 46 |
| Tumors not found at the point of operation | 2 | 13 | 0 | 15 |
| Tumors which could not be removed | 1 | 3 | 0 | 4 |
| Trephining to relieve increased intracranial pressure | 7 | 0 | 0 | 7 |
| Totals | 10 | 16 | 0 | 26 |
| Grand totals | 40 | 31 | 1 | 72 |

When recoveries are spoken of, it is not always to be understood that the patient was relieved of all symptoms or was restored to a normal condition. It means, in the first place, that the patient survived the operation; secondly, that in some cases such terrible symptoms as the agonizing headache and uncontrollable vertigo and vomiting were relieved; and, thirdly, that in a very small percentage of cases

[1] *Op. cit.*

full recovery was practically obtained. Even, however, with paralysis, anæsthesia, deafness, hemianopsia, or blindness left behind, the last condition was better than that before the operation.

Horsley[1] at the International Medical Congress at Berlin in 1890 suggested in cases of inaccessible or malignant growths or in cases in which there are no focal symptoms, yet where the patients suffer from intense headache or from other symptoms of increased intracranial pressure, the propriety of trephining to relieve pressure. He obtained beneficial results of this character in six cases. In one case of Knapp's headache was much relieved by the operation, although no tumor was found. Of course such treatment is only palliative, but palliation is much in a disease which produces the agony of brain tumor.

While, therefore, as yet the literature of the subject shows but few brilliant or even favorable results from trephinings for the removal of intracranial tumors, the future will probably give us an occasional great triumph. The cases have been too few for us to draw positive conclusions. Experience has abundantly shown that the brain-case can be opened with impunity, and in the vast majority of cases, when proper skill is used and proper precautions are taken, without danger to the life of the patient. Serious as is the operation for brain tumor, some cases have recovered from the effects of the operation, and their lives have been rendered more endurable even when a cure has not been achieved. This was notably true of the patient from whom Dr. Keen removed a tumor weighing four ounces. With such facts before us and with further additions to our localizing powers the day will come when we can confidently look for the successful removal of some intracranial growths. The importance of not postponing operations too long cannot be too strongly emphasized, as one of the most serious errors has been that even accessible and removable tumors have as a rule been left far too long before operation was attempted.

The medicinal treatment of intracranial tumors presents but little encouragement, and yet some efforts with medicine should always be made. Syphilitic growths of course offer the most hope of successful treatment, and this treatment should be pursued with some definiteness of purpose and plan. Among neurologists and syphilographers some differences of opinion have prevailed with reference to the advisability of using mercury or iodides or combinations of these drugs. Probably no rules can be laid down which will be of uniform value in the decision of this question. Every case must be studied for itself, and almost every case will be experimented upon with both drugs. If called in to see a case of syphilitic brain tumor at a presumably early stage, resort should first be to active treatment with mercury

[1] *Brit. Med. Journ.*, vol. ii., Dec. 6, 1890.

or with mercury and the iodides combined, ordering, for instance, the protiodide or biniodide to be rapidly increased. This not succeeding, or perhaps at first, mercurial inunction with about ½ drachm of blue ointment, three times daily, at the same time giving from 30 to 60 grains of iodide of potassium or iodide of sodium, three times daily, should be tried. I prefer always to give the sodium salt a trial, although the iodide of potassium may sometimes prove the most useful. The combination of mercurial inunction with the iodide treatment, both in full doses, is sometimes promptly successful.

Mercurial inunctions should be performed with attention to detail, as in other forms of syphilis, and we cannot do better than to quote here the advice of Heubner. "It is advisable," he says, "to let the patient take warm or sulphur baths for a few days before the treatment is begun, in order to promote the capillary circulation of the skin; before each inunction also a bath should be taken or the parts to be anointed at least washed off. The doses to be used in each inunction must be larger in these than in milder cases. We usually order, during the first fourteen days, from 3 to 4 scruples of mercurial ointment, to be rubbed in daily in the usual manner on the lower and upper extremities, the abdomen, and back successively. After this, if an amelioration of the symptoms be noticeable, the same dose is repeated every other day for several weeks, and then half this dose is used at the same intervals for several additional days and weeks according to the course of the affection. With regard to the duration of the treatment, a special warning must be uttered here against a premature discontinuance of it: a return and an aggravation of the affection are too often observed shortly after an interruption of the treatment. In connection with this Yvaren very truly says, 'The treatment must be as obstinate as the disease.' The physician must not lose patience. In general it is advisable to continue the inunctions at least fourteen days after the graver symptoms, such as the disturbances of intellect, the loss of power, or the spasmodic attacks, etc., have disappeared. Moreover, if there be the slightest indication of an aggravation of the affection, a new course of treatment must be commenced. The advice of Sigmund to keep the mouth and teeth scrupulously clean must be carefully complied with, in order to prevent salivation, which would necessitate an interruption of the treatment at too early a period. When the patients are unconscious this duty will devolve on the nurse."[1]

The hypodermic employment of mercury can be resorted to in some cases both of tumor and meningitis, whether cerebral or spinal, with brilliant results. Various preparations of mercury have been used by the hypodermic method, chiefly for the early symptoms of syphilis, but both late secondary, and even tertiary, cases have also yielded to this

[1] Heubner, *Ziemssen's Cycl. Pract. Med.*, Am. ed. vol. xii, p. 367.

mode of treatment even after other methods have failed. Wolff[1] of Philadelphia, carefully reviewed this subject in 1889. The most permanent results have been obtained with inunctions of blue ointment, calomel injections, and corrosive-sublimate injections. On the whole, the treatment by corrosive sublimate has proved the most efficient. The solution employed by Wolff contains 1 part of corrosive sublimate dissolved in 100 parts of distilled water, of which from 12 to 20 minims are injected daily deep under the skin into the connective tissue in the region of the back, from above and below the scapula, down to the gluteal region on both sides and on the sides of the chest. In his cases twenty-five to thirty injections were made successively, the doses being gradually increased until slight gingivitis was experienced, when the amount injected was diminished until it had disappeared. An after-treatment with small doses of potassium iodide or Blanchard's pills of the iodide of iron was continued for three months or longer, the iodides preventing or retarding the elimination of mercury. A gold needle fitted to an ordinary hypodermic syringe encased in hard rubber can be used, or a steel needle well anointed will answer if properly cleaned and changed as often as corrosion indicates this necessity. In a case about which I was consulted by Dr. C. S. Turnbull the symptoms of brain-tumor disappeared under such injections.

More advanced cases, or if the practitioner prefers, any case of syphilitic tumor, may be placed at once upon comparatively large doses of iodide of sodium or iodide of potassium, which should be increased if no bad effects result from its administration, until enormous doses are taken after the so-called American fashion. The treatment may be begun with 30 grains of the iodide given three times daily, increasing the dose each succeeding day by 5 or 10 grains until 120 or even 180 grains are taken three times a day. In a few cases it is surprising not only how well the patients stand these enormous doses, but how much they improve under them. That a patient with syphilitic brain-tumor has not improved under a previous treatment with the iodides should not always discourage us, as it happens occasionally that renewed treatment gives good results or that the former treatment has not been sufficiently aggressive.

The treatment of brain tumors—and the same is true of spinal tumors—is of course often in part the treatment of the accompanying meningitis, but as both the growth itself and its accompaniments are practically to be best treated by the same measures, and as I have already especially discussed meningitis, it will not be necessary to discuss it here. The nausea and vomiting, the headache, the vertigo, the spasms local or general, the hyperæsthesia, and other symptoms which may be referable either to the tumor or to the meningitis, or to

[1] *Therapeutic Gazette*, Nov. 15, 1889.

both, are to be treated by local depletion and counter-irritation, narcotics, hypnotics, and sedatives, and as complete mental and bodily rest as it is possible to give the patient.

Opium and its salts cannot be done without in the treatment of brain tumors; in some instances it would be positive cruelty to deprive the patient of this resource; nevertheless, the conservative physician will not be too hasty in his resort to this drug. He must carefully consider the endurance of his patient and the probable duration of his disease, but a patient can often be rendered comfortable with a comparatively small quantity of the drug judiciously administered. If rashly used enormous doses will soon be required. Hypodermic medication, as would be expected, is the most efficient method, and not infrequently the soothing syringe soon gets into the hands of the patient himself. Care therefore should be taken.

Cannabis indica alone or combined with other drugs, particularly with the bromides and chloral, will often prove very serviceable for the relief of the suffering of a case of brain tumor. In serious advanced cases, where a relief of the otherwise constant agony is imperatively demanded, a good routine method is to give the patient three or four times a day a full dose of a mixture of cannabis indica, chloral, and bromides, and once or twice in the twenty-four hours a hypodermic injection of morphine.

The bromides alone have but little influence in relieving the suffering of brain tumor, although they may be of great value as adjuvants, assisting to prevent the convulsions by relieving cortical irritability, and perhaps in other ways.

Antipyrine and antifebrin, in doses of from 10 to 20 grains, may sometimes be given with advantage in tumor cases, but, like the bromides, they are chiefly valuable with other remedies, like opium and Indian hemp

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## SPINAL TUMORS.

The treatment of spinal tumors presents a worse outlook than that of intracranial growths. Antisyphilitic measures and operation are our only curative resources, but the latter, formerly dismissed as chimerical, absurd, or even cruel, now has an advocacy based upon at least a few striking successes. Nothing need be said about the treatment of syphilitic tumors of the cord and its envelopes different from what has been already stated in discussing the therapeutics of intracranial growths. The same rules and methods of treatment are applicable for all forms of nervous syphilis. If any difference should be made, it ought to be in favor of the most prompt and active treat-

ment in the spinal disorder, as, owing to the small calibre of the spinal canal, a growth might destroy the cord by compression before a lagging therapeutist had pushed his syphilitic remedies sufficiently to prevent the progress of the lesion. Mercurial inunction, hypodermic injections of mercury, rapidly augmenting doses of the protiodide or biniodide of mercury, or of the iodides of sodium or potassium should be vigorously administered, paying the same attention to details as have been insisted upon in the last section.

If the tumor is diagnosticated as tubercular, the treatment must be the same as that advised in tubercular meningitis and tubercular growths within the cranium—namely, mercury, iodides, hydriodic acid, iodoform, iron, malt, cod-liver oil, arsenic, good food, fresh air, rest, opiates, etc.

The removal of tumors of the spinal bones and membranes has been successfully accomplished, and, strange to say, although not for reasons intrinsic to the respective merits and dangers of intracranial and intraspinal operations, more successful results have been achieved in the latter than in the former. Macewen, Gowers, Abbe, and Horsley have all reported successful cases. White and Dercum have reported a case which was seen by me in consultation, in which, although no tumor was found, the removal of peridural connective tissues which had undergone some thickening and the separation of subdural adhesions were followed by very marked improvement in sensation and mobility, which improvement went on to entire recovery. Laquer has reported a case operated upon by Rehan in which a small extradural lymphangioma was found compressing the cauda equina, and was easily removed. Two weeks after all pain had disappeared, and four months after recovery was almost complete, although such serious symptoms had been present as loss of sensation, abolition of the knee-jerks, and continuous and severe sacral pains. White [1] refers to these and to other non-successful cases in an interesting monograph on the surgery of the spine. I have also discussed this subject in a paper on spinal localization.[2]

In spinal tumors, as in other forms of irritative and destructive spinal disease, we may have to deal with particular symptoms of great importance. Cystitis may be present, and if not properly managed may constitute a source of discomfort and danger almost equal to that of the tumor itself. The catheter should be used if necessary, the bladder should be washed out from time to time, the patient should be carefully protected from dribbling, which may lead to excoriation or even abscesses, and remedies to improve the condition of the urine and to annul pain and inflammation should be employed. Hot poul-

[1] *Therapeutic Gazette*, Oct. 15, 1891.
[2] *Ibid.*, May 15 and June 15, 1889.

tices or counter-irritation will often be found of value. Bed-sores may occur, and one form of trophic eschar is especially frequent, that known as the sacro-ischiatic bed-sore or ulcer. The treatment for the relief of pain and suffering is practically the same as for brain tumors.

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## MENINGITIS.

THE treatment of the different forms of encephalic and of spinal meningitis is largely the same. It is unnecessary to separate the discussion of cerebral, cerebellar, and basal meningitis, as the general rules of treatment are the same for all irrespective of location, although prognosis may be much influenced by the position of the disease; but it is far different when we come to consider the treatment of meningitis according to its etiological varieties. A meningitis due to syphilis, tuberculosis, or septicæmia might, for example, require to be handled somewhat differently from one the result of alcohol, rheumatism, or sunstroke.

Meningitis, whether cerebral or spinal, is subdivided, in the first place, into inflammation of the dura mater, or pachymeningitis, and inflammation of the pia-arachnoid or soft membranes, which is often spoken of as leptomeningitis. When the term "meningitis" alone is used inflammation of the pia-arachnoid membrane is commonly meant, but it is better for the clinician and therapeutist always to distinguish between pachymeningitis and leptomeningitis. In the discussion of the forms of meningitis some of the older writers attempted to separate inflammation of the pia mater and arachnoid, and an arachnitis has been described by some writers, but on no certain grounds. Least of all can any reasons be given from a therapeutic standpoint for making this separation. The pia-arachnoid is one membrane for all practical purposes. Both pachymeningitis and leptomeningitis may be either acute or chronic. Inflammation of the dura mater presents two readily separated varieties, external and internal pachymeningitis, according as the outer or inner surface of the membrane is mainly affected; and to this fact some attention must be paid in the discussion of the treatment.

Meningitis either of the dural, or more commonly of the pia-arachnoid, form may be extensively subdivided according to its etiology. The following classification by E. Long Fox[1] is a valuable practical arrangement, particularly for therapeutic discussion, although perhaps capable of some improvement. He divides the cases of meningitis into tuberculous and non-tuberculous, the non-tuberculous including many forms, for the most part as follows: "1. Epidemic cere-

[1] *Am. Journ. Med. Sci.*, vol. xcix., June, 1890.

bro-spinal meningitis; 2. Syphilitic; 3. Traumatic; 4. A form due to a peculiar variety of sunstroke; 5. That brought on by overwork of the brain; 6. A purely idiopathic form, that may or may not be associated with rheumatism and, more rarely, a gouty diathesis; 7. The meningitis that sometimes accompanies a lethal form of delirium tremens; 8. That which is the sequence of purulent disease of the middle ear or of the nasal bones; 9. A form associated with diseased kidneys; 10. One seen in connection with diseased cerebral arteries, and probably dependent, like sclerosis, on imperfect circulation; 11. Meningitis the direct result of the progress of intracerebral or intracranial tumors or cerebral abscess; 12. A form probably due to metastasis, as in erysipelas, but as cerebral meningitis is sometimes found in various forms of blood-poisoning, it is quite likely that in erysipelas it is due rather to the presence of micrococci than to metastasis, the more especially as cerebral meningitis is sometimes a sequence of typhoid, etc."

The paper from which this classification is quoted—one of the few devoted to the treatment of meningitis in journals of recent years, although the literature of the subject is extensive in other directions—contains a number of valuable suggestions, of which I have availed myself in the preparation of this article.

As the treatment of epidemic cerebro-spinal meningitis is considered elsewhere in this SYSTEM, it will not be discussed here. Such etiological varieties of meningitis as those due to rheumatism, gout, erysipelas, etc. would, perhaps, best be considered under the general head of infectious meningitis, although the treatment may differ somewhat according to the special diathesis or primary disease. Meningitis connected with intracranial tumors and cerebral abscesses does not differ essentially from that which is the sequence of purulent disease of the middle ear or of the nasal bones. While the arrangement of Fox is, therefore, useful, as showing many of the ways in which meningitis may originate and the necessity of differences in treatment according to etiology, it need not be closely followed in discussing the therapeutics of the disease. I will, however, have something to say about the treatment of most of the separate forms which he includes in the foregoing classification. Let me first say a few words about the varieties of pachymeningitis and their treatment, although much that is said of meningitis in general and of any form of this affection will answer both for pachymeningitis and leptomeningitis.

External pachymeningitis is rarely if ever a primary disease, and a consideration of its treatment must be largely one also of the affections with which it is associated or to which it is secondary. Frequently it is due to traumatism, and therefore exists with fractures, hæmorrhages, and other results of injury, and little or no headway can be made with

the treatment of the inflammation of the membrane until all persisting irritations are cleared away—until, for instance, the depressed bone is elevated, the penetrating spicula withdrawn, or the hæmorrhage if possible removed or absorbed. The symptoms in such a case may be largely or even mainly dependent upon the diffused and diffusing irritation, the cause of which is limited to a small spot or area, but the latter must be attended to first, or at least at the same time with the former. Another common cause of external pachymeningitis is the spread of inflammation from bone disease, particularly that form of bone disease so often associated with the apparatus of hearing. In a case of this description the ear and bone disease must of course receive full attention while trying to alleviate the accompanying inflammation of the dura mater. Doubtless in a few cases external pachymeningitis originates from sunstroke or heatstroke, and some of the varieties of meningitis referred to by Fox may be, in part at least, affections of the external dura mater, as the syphilitic and infectious forms and those associated with intracranial tumor.

The symptoms of external pachymeningitis are not uniform, but, whether the disease is from injury, from extension of inflammation to neighboring parts, from sunstroke or syphilis, present some similarity in symptomatology. The most common symptoms are headache, which may increase in intensity with the progress of the disorder, vertigo and vomiting, with sometimes, particularly when the inflammation is extensive or spreads inwardly, paresis and convulsions. Of course when suppuration takes place septic symptoms and those of compression may develop, the patient suffering with fever and delirium, and if not relieved perhaps dying in coma. Forms of pachymeningitis both internal and external sometimes occur in the aged and broken-down. The symptoms in such cases are usually not of a definite character, but dull headache is one of the most common, and this is usually associated with some mental obtuseness and deterioration, which, however, is more likely due to the senile brain-degeneration than to the disease of the dura mater. When external pachymeningitis is due to syphilis or any infectious disease its treatment should be that which is applicable to syphilitic or infectious disease of any form. For the pachymeningitis of old age nothing of course can be done but to support the failing strength of the patient and carefully regulate the functions of the various organs.

Internal pachymeningitis may be of several varieties: we may have a purulent form of this disorder, as of the external layers of the dura, and, like the latter, this is almost invariably secondary to disease or injury of other tissues, as after traumatisms of the skull or disease of the petrous portion of the temporal bone. A well-known and much-discussed form of pachymeningitis is that known as internal hæmor-

rhagic pachymeningitis or hæmatoma of the dura mater. Its origin has been much disputed, but this question cannot be gone into here. It is frequently a disease of old age ; it is often found to be present in autopsies upon the insane, although its existence may not have been recognized during life ; it is a comparatively frequent condition in paretic dementia, but may be found in cases of chronic alcoholism, scurvy, and generally in the wretched shipwrecks of humanity who are to be found in great charity hospitals, and are usually the victims of a complication of organic affections, such as phthisis, syphilis, and alcoholism. Its symptoms are not very distinctive, but the cases can sometimes be recognized by a careful diagnostician. They are mainly those which have been mentioned as occurring in external pachymeningitis. Sometimes paralysis or spasm on one side of the body appears also on the other, showing that a new hæmorrhage or inflammation has occurred on the side of the brain at first not affected. Drowsiness, contracted and irresponsive pupils early, and later dilated pupils, and irregular pulse are among the symptoms of the disorder in addition to those already mentioned. In the treatment of this affection all that can be advised is attention to the habits of the patient and to diseases of the kidneys, heart, lungs, etc., occasionally leeching or dry cupping, derivatives and counter-irritants, and during acute attacks saline laxatives, mercury, and sometimes opiates with bromides.

Leaving inflammations of the dura mater, a somewhat barren field, I will pass to the consideration of the treatment of the different varieties of pia-arachnoid inflammation, in the first place, making a few suggestions, which are applicable to any and all forms of meningitis.

As meningitis, multiple neuritis, and probably even myelitis and encephalitis, are often of infectious origin, an important practical matter with reference to the treatment of these inflammations is that of dealing with them actively at an early stage, and if possible from the bacteriologico-therapeutic point of view. I have seen in the chronic stages a few terrible cases of meningitis and multiple neuritis, with or without associated cord and brain inflammations, which were set up during the progress or even at an early stage of such well-known infectious disease as scarlet fever, diphtheria, and grippe. In these cases and in cerebro-spinal fever, while proper attention is paid to the relief of pyrexia and pain by the administration of antipyretics, anodynes, and narcotics, too little sometimes is given to the use of agents which are calculated to combat the organisms in the blood and to change the soil in which they flourish. The administration of large doses of such remedies as bicarbonate of potassium, salicylate of sodium, gaultheria, etc. might be successful in preventing the development or limiting the progress and destructive after-effects of an otherwise severe meningitis or multiple neuritis.

It is the duty of the physician to relieve the suffering of the patient in any form of meningitis. This can be done, in the first place, by absolutely ridding the patient of all external sources of irritation. To direct that the patient shall be kept quiet and free from annoyances should not be a mere routine matter; but noises, bright lights, unnecessary visits and talking, should be strictly prohibited. Both bed and room should be as comfortable as possible. Opium and its preparations are indispensable in most cases: the physician is finally thrown back upon these, and is wanting in his duty to his patient if he does not resort to them when needed, although I would by no means advocate their early or frequent use.

Opium preparations are probably of value in some cases of meningitis, particularly the basilar and spinal varieties, for their stimulant and tonic influence on the nerve-centres. In the epidemic and other forms of meningitis glycosuria is often present, pointing to irritation of the floor of the ventricle. Fox suggests that morphine and other salts of opium may exercise a tonic influence on the centres of the medulla oblongata, as they seem to do in many cases of diabetes. Among the best preparations of opium in meningitis are the deodorized tincture, the salts of morphine, and codeine. It is often best to give these drugs in combination with the bromides or cannabis indica, chloral, or sulphonal. Aconite can sometimes be used advantageously in various combinations, and paraldehyde is particularly useful in alcoholic, traumatic, or other cases with considerable excitement. Drugs of this kind should be used in full doses, although it is sometimes necessary to feel the way, particularly when patients are depressed and weakened and when the disease threatens such important centres as the nucleus of the vagus or of the phrenic. It is remarkable how well and for how long a time some meningitic patients will bear narcotics and sedatives, and particularly opiates.

In all forms of meningitis the reduction of temperature must not be neglected. Occasionally an heroic dose of an antipyretic is necessary to prevent the progress of the disease to death. The mistake, however, must not be made—one of somewhat frequent occurrence in these latter days when antipyretics are the most fashionable drugs in acute affections—of resorting to antipyretics indiscriminately, or of using them too continuously, or as the sole treatment in a case which at the same time demands alteratives and absorbents as well as tonics, stimulants, and nutrients. The remedies of most importance are antipyrine, antifebrin, phenacetin, and aconite. Quinine, combined with moderate or large doses of hydrobromic acid, has sometimes proved useful. While wet packs and cold general baths are not advisable, owing to the weakened condition of the patient and the complications of the disease, sponging with cold or with tepid water

is often of great value in reducing temperature and quieting the irritability and restlessness of the patient.

According to Huguenin, cold water and a lukewarm bath are the vigorous means of temporarily rescuing patients from coma even in tubercular meningitis. In non-tubercular forms of meningitis, especially in children, he describes himself as an enthusiastic votary of this treatment. They are especially useful in bringing the patient out of states of coma, for which purposes cold compresses can also be used. Ice-bags to the head and cold affusions are old remedies that need judgment in their use.

I will now pass to the special consideration of some of the etiological varieties of meningitis.

The treatment of tuberculous meningitis is not a promising field, and yet this affection demands treatment for the palliation of symptoms which cause suffering, and even with the view that it may be possible to arrest the progress of the disorder. Its prevention in many cases is possible, and therefore prophylaxis rises to the highest importance. In families with a history of tuberculosis the possibility of its occurrence should be borne in mind, and tuberculous mothers should not nurse their children, and such children should be kept in the open air as much as possible. Where families are in the habit of leaving town they should go to the seashore or the mountains as early as possible in the season. For the children of the poor much can be and is done for the prevention of all tuberculous diseases and of disease in general by the various humane enterprises which under the name of the "fresh-air fund," etc. take children to the country, to the seashore, or to the mountains for brief periods during the hot months. Such changes do more to prevent the development of constitutional diseases in weakly or badly-environed children than the most liberal use of medicines or nutrients. It is not necessary, however, to dwell at length upon matters of this kind, which are treated of fully under other heads, and I would refer the reader therefore to the exhaustive paper on Tuberculosis by Dr. S. Solis Cohen in Volume I. of this SYSTEM.

The possibility of curing tubercular meningitis when not too far advanced has been advocated. Cures have been claimed, by Hahn, for example, of seven cases, but, according to Minot,[1] in five of these evidence is entirely wanting that they were tubercular meningitis. Cadet de Gassicourt concludes that most of the alleged cures are cases of limited extent arising from the presence of tubercular tumors, syphilitic gummata, cerebral sclerosis, and neoplasms of various kinds. Fox says: "Many practitioners have seen cases supposed to be of tuberculous meningitis recover, and the not rare instances of chronic

[1] Pepper's *Syst. of Med.*, vol. v. p. 735.

meningitis with distended ventricles, with the views of some neurologists that certain cases of insanity have been caused by a meningitis partially recovered from, show that when the amount of the tubercle is small and there are no physical signs of general tuberculosis partial recovery from the original disease is not impossible."[1]

The fact that tubercular meningitis cannot always be distinguished from leptomeningitis of a more curable type is an argument in favor of active treatment at least for doubtful cases. On general principles it would seem that tubercular processes within the cranium, as similar disease elsewhere, might sometimes be arrested. Hasse was a believer in the curability of miliary tubercular meningitis of the pia mater, but Huguenin states that he has never found in the pia mater anything resembling a harmless encapsulated deposit, or indeed instances of absorbed miliary tubercle. He does not therefore consider a recovery as proved, but regards it as undecided whether a very limited number of miliary tubercles might remain without doing any harm, and might be subsequently removed by some retrograde process.[2]

Among remedies recommended by various authorities as having some special value in tubercular meningitis are mercury, the iodide of potassium and of sodium, and iodoform. Certainly a trial should be given to one or more of these drugs in a dose proportioned to the age of the patient. In children the doses of the iodide should vary between 1 and 5 grains three or four times daily, while for adults the doses may range as high as from 10 to 15 grains. Preferably, however, they should be the smaller amount; it is a mistake to push iodide in tubercular meningitis as would be done in syphilitic cases. An excellent combination possibly to act upon the disease itself, and at the same time to relieve restlessness, irritability, sleeplessness, and pain, is that of iodide of sodium with bromide of sodium, and either cannabis indica or hyoscyamus, preferably in the form of tincture, and in doses ranging from 5 drops to $\frac{1}{2}$ drachm, according to age and indications. Syrup of hydriodic acid is a remedy well worthy of trial on the same principles that the iodide would be used.

Mercury seems to have gone somewhat out of repute, although at one time the chief resort in tubercular as in other forms of meningitis. If used at all, it should be in small dose frequently repeated, and preferably in the form of calomel or corrosive sublimate. An advantage seems to accrue from a combination of mercurial preparations with other cathartics for the relief of the constipation which so often accompanies these cases. Even if mercury is regarded as practically useless in tubercular meningitis, as the diagnosis between it and non-tubercular

[1] Fox, *Am. Journ. Med. Sci.*, vol. xcix., June, 1890.

[2] *Ziemssen's Cycl. Pract. Med.*, Am. ed., vol. xii. p. 574. Hasse is cited by Huguenin.

meningitis is often doubtful, and as it is certainly useful in the latter affection, it should in some cases at least be given a trial.

Of external applications for tubercular meningitis, mercurial ointment and iodine ointment were formerly much in vogue, but of late years have as a rule been abandoned. Fox says that inunction with iodoform ointment is sometimes useful.

The use of antipyretics in tubercular meningitis has been a subject of some dispute. Huguenin advises them only in cases where the diagnosis is doubtful, as between meningitis or typhoid fever or septicæmia, holding that in such doubtful cases the treatment to be followed would be the use of cold bath, quinine, salicylic acid, and salicylate of sodium. A reason for using antipyretics given by Fox is worthy of attention, and that is that the pyrexia, however induced, is favorable to the increase of the tuberculous as of many other bacilli, possibly by paralyzing the inhibitory heat-centres by the absorption of the poisonous chemical products of their growth. Under such conditions reduction of temperature should be attempted, preferably with antipyrine, which may be given with digitalis to counteract the depressing effects on the cardiac nerves caused by the presence of the inflammation in the pons-oblongata region. Phenacetin may prove useful for this indication as well as to relieve pain.

In these days of great surgical advance the operative treatment even of tubercular meningitis cannot be passed by as unworthy of consideration. In rare cases tubercular deposits may be so isolated as to form growths which are capable of removal.

Lanphear[1] has advocated an operation in tubercular meningitis which, so far as I know, has never yet been tried—namely, opening the skull and washing out the meningeal spaces as we do the belly in tubercular meningitis. He reasons that the peculiar disappearance of the tubercular process in peritonitis, treated by flushing the abdomen, leads to the conclusion that a similar result might be anticipated in tubercular meningitis when complicated with hydrocephalus. Professors Senn of Chicago and Keen of Philadelphia, who were written to by Lanphear, believe the operation justifiable. The former advocates tapping with a small trocar under strictest antiseptic precautions, and injecting 2 drachms of a 10 per cent. iodoform-glycerin emulsion —practically the same treatment which has proved so successful in tuberculosis of the joints. Keen prefers opening the skull, tapping the ventricles, irrigation, and drainage.

Meningitis due to syphilis may be either of the convexity or of the base: perhaps more commonly than other forms it is likely to attack limited and scattered areas of the brain-membranes; often the different membranes may be attacked at the same time in different places, and

[1] *Am. Journ. Surg. and Gyn.*, vol. ii., Jan., 1892, No. 6, p. 143.

not uncommonly bone disease is associated. The remedies which will prove most useful in such cases are, internally, calomel, the bichloride or the biniodide of mercury, and, in large doses, the iodide of sodium, the iodide of potassium, or hydriodic acid. Affections of the cranial nerves—oculo-motor paralysis or paralysis of the fourth, fifth, sixth, or seventh nerves, and more rarely of the eighth—are seen in such cases almost as frequently as in tubercular meningitis. The appropriate treatment should be used early and energetically, the preference being first given to mercury; and here, as in tumors of the brain or its membranes, mercurial inunctions or corrosive-sublimate injections will often be found of the greatest service. Such treatment, pushed at an early period, may prevent the local softenings which so often result from the thrombosis which accompanies syphilitic meningitis and arteritis.

The form of meningitis which occasionally occurs from sunstroke or heatstroke does not call for any particular line of medication, except perhaps that in such cases, if the disorder is acute or subacute, leeching, cold effusion, or counter-irritation to the vertex, and, as the patients are often depressed and exhausted, caffeine, digitalis, and ammonia combined with the bromides and other sedatives, may prove of particular value.

Meningitis of traumatic origin, in the first place, calls for surgical decision. If any clear indications for operation exist, as an evident depressed fracture, trephining should be at once employed. Localized pachymeningitis frequently results from severe injuries, even in the absence of fractures. Extravasations small or large are caused by the concussion, and may act as a focus from which inflammation spreads. The most common train of symptoms in such cases is a combination of localized pain with dizziness, sometimes nausea, and states of nervous irritability and apprehension. Such cases, however long they may have endured, should not be passed thoughtlessly by. Careful examination of the shaven scalp should always be made for cicatrices and depressions, and even exploratory operations should be performed if in doubt as to the conditions. If operation is decided against, an active, aggressive treatment should be given a fair trial. This, in the first place, should consist of counter-irritation with croton oil, tartar emetic, or other irritating ointments, preceded or accompanied by localized bloodletting, preferably with leeches, as near as possible to the seat of injury or to the place where the counter-irritative treatment is applied. For alterative and absorbent treatment I prefer in these cases to give large doses of iodide of sodium, as from 20 to 60 grains, combined usually with bromide of sodium in an equal or less quantity. If the case does not improve promptly under iodide treatment, mercury should be added in the form of inunction or of the internal administration of bichloride or biniodide.

In traumatic cases, no less than in others, rest and quiet should be strictly enforced; and abstinence from alcohol, and even from tobacco, is often of the greatest importance. Paraldehyde in doses as large as from 1 to 2 drachms is sometimes of great value in traumatic as in other forms of meningitis; the dose given of this drug is sometimes too small to be of any practical benefit, although, on the other hand, it is true that we may not always be able to use it in as large doses in meningitis as in delirium tremens and in some of the forms of acute mania.

Fox refers to one form of meningitis brought on by overwork of the brain, and occurring in children from cramming and competition in schools. The evil effects of forced and unwholesome school-work are many and serious, and have been the object of some personal investigation on my part. Meningitis, however, is certainly rarely due wholly to such a cause: even the severest intellectual labor associated with irregular habits in adults rarely results in meningitis in the absence of other causes, as constitutional disease, infection, injury, alcoholism, or inherited tendency. Cerebral hyperæmia is doubtless produced in this way, and yet even this is of comparatively rare occurrence. It is important for therapeutic reasons to have clear ideas upon this subject, as it is a somewhat popular and prevalent notion that meningitis often results from mental overstrain both in the young and in the mature, and hence treatment is misdirected. The affections and conditions which originate in this way may be almost or quite as serious as a pure meningitis, but they are rather forms of neurasthenia, melancholia, chorea, hysteria, hystero-epilepsy, and other functional mental and nervous diseases. Cases with clear symptoms of meningitis have, however, been reported as occurring in young children who were overworked and overworried with school duties and the accompanying emotional excitement, or in adults engaged in some trying intellectual labor carried on day and night under difficulties and embarrassments. The best explanation of most of these cases is that latent or predisposed constitutional disease, such as tubercular, alcoholic, syphilitic, rheumatic, or gouty meningitis, has been lighted up by flushing the brain and weakening the general system. Treatment in such cases should therefore be twofold, or perhaps threefold. A constitutional affection should be sought for, and remedies to combat it employed, while at the same time resort is had to measures to reduce inflammation and to strengthen the debilitated patient. Complete rest of mind and body, which of course includes the removal of all sources of strain and excitement, should be required. Iodides, mercury, hydriodic acid, alkalies, the salicylic preparations, and other remedies designed to change the toxæmic state of the blood, and drugs like the bromides, hydrobromic acid, aconite, veratrum, conium, hyos-

cine, and the coal-oil derivatives, may be indicated. In short, we know of no special or specific treatment for a meningitis coming on and apparently due to overwork of the brain. Prophylaxis is here the best of all remedies.

I do not like the term "idiopathic," no matter to what disease it is applied, and it seems to me particularly lacking in accuracy when used to describe a meningitis. A meningitis of unknown cause which might be regarded as idiopathic should simply be treated upon the same principles as those cases to which we have referred as occurring apparently from overwork. If rheumatism, gout, erysipelas, influenza, diphtheria, scarlet fever, small-pox, arsenic, lead, or any infectious disease or toxic agent can be reasonably regarded as the source of a meningeal inflammation, the treatment should be pushed with remedies for these constitutional conditions at the earliest possible stage of the affection in accordance with the principles which we have already indicated when speaking of the various inflammatory disorders which are of infectious and toxic origin.

That a chronic form of inflammation of the cerebral membranes occurs in connection with diseased kidneys and diseased blood-vessels admits of but little doubt. The numerous autopsies held at large charitable institutions—like the Philadelphia Hospital, for instance—often reveal opaque and thickened membranes, particularly a low form of what might be called pia-arachnitis; but for such a disease we have no special or specific treatment. Therapeutics should be directed to the relief and improvement of the conditions which are brought about by the diseased kidneys, degenerated heart, and rigid vessels. Doubtless in such cases hyperæmic exacerbations are of frequent occurrence, and can be profitably attacked with bromides, antipyrine, and similar remedies, but such treatment will be only of partial avail, or possibly harmful, if heart and kidneys are not duly attended to and the strength of the patient sustained. Much good is accomplished in such exacerbations by careful attention to the liver and gastro-intestinal tracts for reasons which need no discussion.

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## CEREBRITIS.

THE synonyms of cerebritis are encephalitis and inflammation of the brain. The nature and frequency of inflammation of the brain are subjects which have been much disputed by clinicians and pathologists, and particularly the latter. Formerly almost all forms of brain softening were ascribed to inflammation; of late the tendency rather seems to be to exclude inflammation altogether as a cause of softening. Both of

these extreme positions are wrong, although it is true that softening of the brain is much more frequently due to occlusion of vessels than to any other cause. Durand-Fardel was one of the most persistent advocates of the inflammatory theory, and Hughlings Jackson was among the earliest clearly to combat the doctrine, holding that this pathological condition was local and due to closure of vessels, and usually to embolism and thrombosis. Besides embolism or thrombosis, however, blood-vessels may be closed by other processes, as the encroachment of a tumor or an exostosis.

Idiopathic cerebritis has been described, but, like many "idiopathic" diseases, it probably exists only in name. A generalized idiopathic cerebritis may be dismissed. General inflammation of the brain, like general softening, has never been seen, and is a practical impossibility; but widely, almost generally diffused, centres or foci of inflammation and similar areas or lacunæ of softening are of not infrequent occurrence. It is the difference between widely distributed local processes and a continuous process throughout an extensive region. After either inflammation or softening from vascular occlusion has exceeded certain limits death must result. A diffuse form of surface cerebritis is sometimes met with, but it can by no means be ranked as general inflammation of the brain-substance. It is a pericerebritis or periencephalitis, affecting only the cortical gray matter, and perhaps only the superficial layers of the cortex. From the very nature of the intimate connection between the pia-arachnoid membrane and the brain itself this periencephalitis must be nearly if not quite always associated with a meningitis, so that the affection will be rather a meningo-encephalitis or meningo-cerebritis than a pure cerebritis; but as its treatment is practically the same as that of cerebritis, its occurrence should be borne in mind. The coexistence of cerebritis with meningitis of course renders the prognosis more serious and the treatment less hopeful, but the indications for treatment are for this reason more urgent. In general paralysis of the insane a chronic periencephalitis or meningo-encephalitis which leads to brain destruction and atrophy may be an important part of the disease.

In 1884, Strumpell made a suggestion which has attracted some support, but more opposition: this was that certain forms of infantile cerebral hemiplegia were due to an acute and more or less localized cortical polioencephalitis, similar in character to the anterior poliomyelitis which causes spinal infantile paralysis, and the various forms of nuclear encephalitis, which result in bulbar paralysis or ophthalmoplegia. The cases with autopsies which support the conclusion are so far very few. Sachs and Peterson,[1] who are not emphatic in their endorsement of Strumpell's position, nevertheless give some

[1] *Journ. Nerv. and Ment. Dis.*, May, 1890, vol. xv. p. 320.

interesting facts bearing upon the question. They refer to the history given by Mobius of two children in one family, aged one and a half and three years respectively, who were stricken down with fever, loss of appetite, and somnolence—one developed a typical poliomyelitis of the upper extremity, the other spasmodic hemiplegia without aphasia. They refer also to Strumpell's two cases of adult apoplexy, in which every one would have made the diagnosis—and indeed he made it—of embolic softening, but the post-mortem examination revealed a condition of hæmorrhagic encephalitis of the gray as well as the white matter. Marie believes that the encephalitis may attack the white as well as the gray matter; and both Jendrassik and Marie favor the perivascular (inflammatory) origin of the lobar sclerosis, which they have carefully described. Sachs and Peterson venture the opinion that polioencephalitis corticalis may be the cause of some of the cases of infantile palsies, both hemiplegic and diplegic, and refer to cases of their own.

The disease, as described by Strumpell, usually comes on acutely in very young children, vomiting, convulsions, and fever being the prominent symptoms. Sometimes complete recovery takes place in a week or two; sometimes paralysis, usually monoplegic or hemiplegic, but sometimes of irregular type, is left behind. Contractures, atrophies, monochoreas or hemichoreas, hemiathetosis, chronic convulsions, often of the unilateral type, and a greater or less grade of imbecility, are the most common persistent states. This disease should at least be looked for and its treatment anticipated. Like anterior poliomyelitis, its occurrence is usually overlooked until its sequelæ have attracted attention.

Besides the acute cortical polioencephalitis of Strumpell, other special forms of brain inflammation have been described, as, for example, inflammatory hypertrophy of the brain cortex, with a symptomatology which includes epileptiform convulsions and some arrest of mental development. Such a case has been studied by Danillo and is referred to by Spitzka,[1] who speaks also of a form of miliary encephalitis in a new-born child due to septic causes, such as suppuration of the umbilical cord.

Commonly cerebritis is an associated affection; it frequently accompanies a meningitis either localized or diffused; brain tumors usually give rise to both meningitis and cerebritis in their vicinity; at a certain stage of hæmorrhagic apoplexy inflammation of the surrounding tissues occurs, and it may also arise in connection with either thrombosis or embolism, the plugged vessels acting as foci of irritation; injuries of the brain, even when they are not accompanied by fracture, and frequently when they are, sometimes have cerebritis as one of their results,

[1] *American Syst. Pract. Med.*, vol. v., 1886, p. 792.

and cerebritis often accompanies bone disease, either simple osteitis or caries. An area of inflammation, which has been called the encephalitic zone, may, in short, be set up around anything which having been introduced into a special local area of the brain acts there as an irritant. It may therefore surround a foreign body, depressed bone, a tumor, an embolus, or an infarct. Such facts must be borne in mind even in the discussion of the treatment of cerebritis. The treatment of the meningitis and cerebritis which accompany hæmorrhages, tumors, bone diseases, etc. is often the most important matter in the management of the case, as these affections may be the source not only of much of the pain which the patient suffers, but of many if not of most of the other symptoms.

In various ways cerebritis may give rise to that most serious and commonly incurable affection, abscess of the brain, and it is important, if possible, by either prophylaxis or by treatment, to prevent this undesirable consummation. When the inflammation is of a violent character, the lymphoid cells may become so numerous and so active as to set up suppuration; and Gowers states that such a purulent condition has been acquired in as short a time as six or seven days, but usually it takes much longer than this for a severe inflammation to result in abscess. When an abscess results directly from inflammation, the early stage of the process presents the condition which is often described under the name of "red softening." Hæmorrhagic foci, collections of leucocytes, effused liquids, and disintegrated tissue-elements are found in cases of red softening; and, carried a little farther, the inflammation passes into a purulent stage.

Abscess is sometimes caused by emboli of a septic or specific character. Certain infectious agencies may excite inflammation and eventually lead to the formation of abscess. Various acute diseases of infectious or contagious character, as diphtheria, scarlet fever, variola, influenza, typhoid or typhus fever, and erysipelas, may set up a disseminated cerebritis of peculiar character. Little foci of inflammation are scattered here and there throughout the brain. This form of disseminated cerebritis may also be present in septicæmia. What has been termed mycosis of the brain is a form of this disseminated inflammation—an affection in which little colonies of micrococci are found scattered throughout the brain.

The possibility of the occurrence of disseminated or other forms of encephalitis should be borne in mind in the treatment of serious cases of infectious disease. The treatment of such diseases in certain stages may become, in fact, the prophylactic treatment of cerebritis or of meningitis, or of both; and a fuller recognition of this truth will result in an improvement in therapeutics which will give fewer grave sequelæ of these infectious diseases. In diphtheria, scarlet fever,

typhoid fever, erysipelas, and similar affections, when symptoms of active, multiple inflammation present themselves, resort should at once be had to that treatment which will most successfully avert these threatened inflammations, while at the same time the patient's general health is carefully sustained.

It is difficult to give a clear symptom picture of cerebritis, for reasons which are evident in the discussion of its varieties. The order and train of these symptoms must differ according to the extent and seat and character of the inflammation. Some symptoms are likely to be present in all varieties, and among these headache of a deep-seated character is the most common. Delirium and convulsions are also frequent, but not nearly as common an occurrence as boring or deep-seated headache. If the case is one of pure cerebritis, which is rare, optic neuritis is not necessarily, or even likely to be, present. Of course the symptoms will vary much with the seat of inflammation—whether, for instance, it is situated in the sensory or motor brain-areas—but unless the inflammation goes on to abscess the local symptoms are frequently clouded by the general disturbances, such as headache, delirium, and convulsions. The disseminated cerebritis of which we have spoken as occurring in various infectious diseases and as the result of septic inflammation presents no regular train of symptoms.

The diagnosis of cerebritis once having been made, its treatment will not differ in any essentials from that of meningitis, with which it is so commonly associated. The treatment must, however, be modified somewhat by a consideration of the variety of the affection with which the physician is called upon to deal—whether, for instance, he has a diffused periencephalitis or meningo-encephalitis; a localized cortical polioencephalitis; a cerebritis due to septic infection, or following or accompanying an acute infectious disease; or a cerebritis caused by traumatism, sunstroke, or toxic agents, or associated with osteitis, caries, abscess, tumor, hæmorrhage, embolism, or other local disease. Certain general principles of treatment will of course obtain, no matter what may be the variety of the affection.

The importance of early recognizing the possibility of infection giving rise to cerebritis, as well as to meningitis and neuritis, cannot be too strongly emphasized. In the section on Meningitis I have tried to enforce the point, and need not insist at length upon it here. The physician should be alert in suppurative affections and in all serious cases of contagious, infectious, or toxic diseases, such as those due to alcohol, arsenic, lead, and poisonous gases, etc., for the occurrence of cerebritis, and should actively treat these affections at the right stages with blood-changing, germicide, and other appropriate remedies, like potassium bicarbonate and other alkaline salts, the salicylates, salicin, salol, mercury, and iodide preparations.

Attention to the reduction of temperature is imperative in cerebritis as in meningitis. Rise in temperature, as has been shown, is in brain hæmorrhage one of the evidences of the setting up of an inflammatory process around the clot. This is to be combated by the careful use of the same remedies recommended for meningitis—namely, by antipyrine, phenacetin, aconite, quinine, sponging, cold to the head, etc.

The special value of mercury in the forms of both cerebritis and meningitis which are due to injury has long been advocated, and by some as strongly to-day, but perhaps on different principles, as in former times. No physician can afford to omit the use of calomel or bichloride of mercury internally, or inunction with mercurial ointment, in cases of injury in which, before or in spite of surgical procedure, the tide of inflammation is rapidly rising. Such treatment should be usually pushed to the point of constitutional impression. With it the iodides may be administered, and my own preference is for the iodide of sodium in doses of 30 grains or more.

Only in rare cases of acute inflammation in a strong patient would general bloodletting be advisable, but leeches or cupping may sometimes be used, particularly when active cerebritis has arisen as a complication of tumor, fracture, mastoid disease, or anything causing extreme local irritation. The use of counter-irritation to the head or the back of the neck is also of service should a localized cerebritis be recognized.

When a case of cerebritis assumes a decidedly convulsive type, no combination is better than that of the bromides with antipyrine or antifebrin, giving as a rule about one-third as much of the latter as of the former drug, as 30 grains of bromide of potassium or of mixed bromides with 10 of antipyrine or antifebrin. Such a symptom as constipation must be met by the same methods of treatment as would apply to meningitis or to any other forms of brain disease.

Both to prevent cerebritis, and to keep it from passing to a purulent stage, attention to the general health of the patient is of the utmost importance. Some cases with a history of injury or of ear disease, either with or without strumous or tuberculous tendencies, may present for months or even years signs of a low form of chronic inflammation of the brain or its membranes which may eventuate in abscess. It is particularly in cases of this character that tonics, nutrients, fresh air, and good food may be efficient means of arresting or aborting inflammation of the brain.

For the localized cortical polioencephalitis of Strumpell the physician will seldom have the opportunity to try treatment, as the disease is not often recognized except by the resulting palsies, choreas, spastic states, convulsions, or mental change. In this respect the affection differs but little from that which is so much more common, anterior

poliomyelitis or spinal infantile paralysis, which is usually overlooked in the acute stage, although, owing to the addition to our knowledge of anterior poliomyelitis, physicians are much more than formerly on the lookout for its occurrence, and cases are now occasionally recognized in their acute stages, and treatment sometimes applied with resulting benefit. In like manner, when children are abruptly attacked with apparently causeless fever, convulsions, vomiting, etc., polioencephalitis should be thought of, and the patient put upon appropriate treatment, which, as the disease is probably infectious, should consist of remedies like mercury, potassium bicarbonate, salicylate of sodium, etc., already referred to so often. In these cases of cerebritis, as well as in poliomyelitis of infectious origin, a practical diagnostic point is the fact that, no matter what the form of organic nervous disease due to infectious or toxic agencies, some neuritis is likely to be an accompaniment. Such patients often have hyperæsthetic limbs or tender areas in various parts of the body, even when the predominating affection is of the brain or spinal cord.

As cerebritis so frequently results in abscess, but as also this result is not absolutely necessary, it is important to do everything possible to prevent this result. In cases of fracture prompt and appropriate surgical interference should be rendered. After an injury without visible fracture and with or without contusion or bruising, such symptoms as pain, vertigo, vomiting, and fever point to both meningitis and cerebritis. Cerebritis, and eventually abscess, is of course most frequently a complication of disease of the ear. This should always be remembered; for even the lapse of many years does not bar out its occurrence. Where the symptoms are such as to indicate localized cerebral inflammation the condition of the mastoid cells and of the middle and the inner ear should be the subject of careful investigation. Inflammation of the brain and abscess do not always result from a spread of the disease by contiguity, although this is often the case: they sometimes arise by septic infection through the veins or by the way of the perivascular lymphatic canals. Treatment should be directed in the one case to the direct surgical relief of the mastoid and the middle and internal ear, and in the other either to the destruction of the infecting microbes or to the changing of the blood in which they are multiplying.

While the treatment of cerebral abscess does not come properly within the scope of a paper on cerebritis, a few words may be said about it, as the prompt relief of an abscess of this form may be not only directly beneficial to the patient by freeing the organ of pus, but also by stopping the further spread of the accompanying inflammation. The simple rule should be that if the presence of an abscess is determined and it is accessible, it should be operated upon as speed-

ily as possible. Within a few years medical literature has been enriched by the reports of successful cases of trephining for cerebral abscess, the operations having been guided in some instances solely by cerebral localization.

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## NEURITIS.

Neuritis, or nerve inflammation, has recently risen to a plane of great importance. Only a few years since the disease received but scant attention, although some of the older authorities in neurology and general medicine, as Remak, Benedikt, Niemeyer, and Mitchell, recognized its frequent occurrence and numerous manifestations. It is sometimes difficult to classify the forms of neuritis for the purposes of considering its treatment. The best subdivisions for this purpose are those which have regard to its acute or chronic character, to its diffusion, and to its etiology.

All forms of neuritis may be subdivided into acute, subacute, and chronic varieties. Neuritis may also be classed as local, diffusing, and multiple. A local neuritis is one affecting any nerve or part of a nerve or group of nerves. Diffusing neuritis may be observed in any part of the body, usually in the limbs—for instance, beginning at one place, the inflammation tends to ascend the nerve. The terms "ascending neuritis" and "neuritis migrans" have sometimes been applied to this form. Finally, many nerves or almost all the nerves of the body may suffer simultaneously, giving the affection, recently much studied, known as multiple neuritis. Etiologically, the varieties of neuritis may best be divided into spontaneous—that is, without known cause—and traumatic, toxic, infectious, and epidemic or endemic, although other general classes could readily be made.

Pathologically, we may have (1) a perineuritis, the inflammation affecting solely or principally the sheath of the nerve; (2) a parenchymatous or degenerative neuritis, the nerve-fibres themselves being involved; (3) an interstitial neuritis, in which the connective tissue between the nerve-fibres is chiefly attacked; (4) a diffused neuritis, in which all parts of the nerve-bundle are more or less affected. The treatment of neuritis, however, cannot to any large extent be influenced by a consideration of its pathological varieties, except that this might suggest more promptness and vigor in the severe acute forms and more persistence in those varieties which lead to extensive and profound degeneration. Clinically, it is difficult to distinguish even between perineuritis and other forms of nerve inflammation; but we can distinguish between pain in a nerve-trunk due to central disorder,

and that dependent upon a localized affection of the nerve or of its sheath —a most important differentiation from the therapeutical standpoint.

After briefly considering the symptomatology of neuritis—which is necessary to the clear understanding of its treatment—I will first discuss the therapeutics of some of the local and diffusing forms of inflammation, and then that of multiple neuritis and one of its epidemic varieties known as beri-beri.

Acute neuritis is sometimes ushered in by constitutional symptoms, such as headache and chilliness or chills, and fever, and these may be present when the affection is local, although more likely to occur when it is diffused or multiple. When acute or subacute, pain is experienced, usually aching, burning, or boring in character, and situated in the line of a nerve-trunk or radiating through certain nerve-distributions. This pain will be felt not only wherever the inflammation exists, but it may be projected to parts somewhat remote, as a nerve irritated anywhere in its course may evoke a response in any place to which it is distributed. Subjective pain, however, is not sufficient for the diagnosis of neuritis; particularly when of acute or subacute type, sensitiveness or hyperæsthesia is always a prominent manifestation, pressure over nerve-trunks or endings sometimes causing extreme pain. Compressing a nerve between other structures may cause great agony, as, for instance, on squeezing the foot when the digital branches of the plantar nerve are inflamed. Various paræsthesias or perverted sensations, as feelings of burning, tingling, pricking, and numbness, may show themselves. The degrees both of pain and sensitiveness differ considerably in neuritis according to its location and diffusion. I have seen a few cases which might be described as dermal neuritis, in which the skin was exquisitely painful and tender throughout the entire limb, the sensory symptoms not following special nerve lines or radiations. In other cases the tenderness to pressure can only be determined by carefully searching for accessible nerve-points or nerve-trunks, but if these are found and are pressed upon or rolled between the fingers, the sensitiveness is extreme, as it is also if muscle-masses are pinched or squeezed between the fingers, probably because of the inflammation in the nerves of the skin, subcutaneous tissues, and muscles: although as a true myositis it is sometimes concurrent with neuritis, this may be the explanation in part of the pain.

Local spasmodic phenomena are occasionally observed in the acute and subacute as well as in the chronic variety of neuritis, as are also increased perspiration or other abnormality of secretion, joint effusions, changes in the skin and subcutaneous tissues, redness and swelling even at times to the extent of œdema, the condition which was first described by Mitchell, Morehouse, and Keen as "glossy skin," and herpetic and other eruptions.

Chronic neuritis is usually the sequence to an attack of acute inflammation, with perhaps an intermediate subacute stage; but sometimes the symptoms are subacute or practically chronic from the first. Pain is a nearly continuous symptom, and has exacerbations under such exciting causes as weather changes, irregularities of diet, and nervous excitement. This pain is usually described as dull, aching, or gnawing. Tenderness and paræthesias, while present, are not so severe and annoying as in the acuter forms of the disease. As more or less degeneration of the nerves affected has usually taken place, the results of this degeneration are to be found in diminutions and losses both of sensation and motion. Commonly all the forms of sensation are depressed or lost. Paresis or paralysis will be shown in degree according to the motor nerves involved. In some cases of chronic degenerative neuritis anæsthesia predominates over motor paralysis, but in other cases the motor paralysis is more marked. Muscles as well as nerves degenerate, and changes in the electrical reactions of nerves and muscles of course occur; while trophic disturbances, such as changes in the hair, nails, skin, and joints, are common.

The total picture of a case of neuritis will depend largely upon its localization and intensity. It may be of any extent from mild inflammation of peripheral nerve-endings or short reaches of a nerve-trunk to a severe affection spreading through an entire limb or even all the limbs, sometimes indeed diffusing until it includes in its painful and destructive march nerves, like the pneumogastric, the integrity of which is necessary to life.

The acuteness, subacuteness, or chronicity of neuritis may have an important bearing upon its treatment. Remedies of great value in the acute stage, as leeching, cupping, mercurials, salicylic compounds, rest, etc., may be useless or even harmful when the disease has become chronic. In the chronic disease electricity in the form of strong galvanic or even faradic currents, massage, Swedish movements, and even active gymnastics and exercise, may be most efficient, while in the acute and even in the subacute stages such measures might simply tend to increase irritation and inflammation, especially in unskilled hands. When neuritis passes into a subacute period or has been practically subacute from the first, too aggressive treatment may result in damage. Rest, gentle massage, and moderate doses of remedies which will be referred to hereafter, such as phenacetin, salol, salicylate of sodium or of cinchonidine, will prove most serviceable, while a too active and depletive treatment, such as would be suitable for acute sthenic neuritis, would do harm by its depressing effects upon the patient. Points with reference to the differences of treatment according to the stage or intensity of the neuritis will appear as we discuss special varieties.

The distinction between neuritis and neuralgia, using the latter term to designate a particular disease and not simply to describe pain in the course of a nerve, is one that should be made by the therapeutist. Many cases formerly regarded as neuralgias are now classed under the head of neuritis, and many of the diagnostic points formerly given to prove the existence of true neuralgia cannot be depended upon positively; but in spite of the difficulties of differentiation, the best authorities still hold to the existence of two distinct diseases, the neuralgias proper being probably due to molecular disturbances in the nerve-trunks or nerve-centres. In neuralgia the nerves affected are not the seat, or at least not the continuous seat, of tenderness. A neuralgia often shifts from one place to another, and the pain is more intermittent; it is not associated with anæsthesias and paralyses. Swelling of the nerve and of the adjacent parts is not present in neuralgia as in neuritis. It is difficult to distinguish between a mild neuritis and a neuralgia. Sometimes an inflamed nerve is so situated that it cannot be reached and tested for tenderness, so that the diagnosis may have to remain undetermined.

The treatment of a true neuralgia for some indications, as the immediate relief of pain, is the same as that of neuritis, but for others it differs essentially. Neuralgias are often accompanied by conditions of exhaustion which contraindicate remedies like antipyrine, gaultheria, and the salicylates, which do so much good in some cases of neuritis. In acute neuritis such drugs as strychnine, arsenic, iron, phosphorus, the copper and zinc salts, which are of great value in neuralgias, may not be called for. Operations like acupuncture, nerve-section, nerve-stretching, etc. are more useful in neuralgias than in neuritis.

Neuritis may be of any nerve of the body. Numerous disorders which are in their beginning or at periods of their progress examples of neuritis are discussed under various heads, as under facial paralysis, ptosis, radial paralysis, spasmodic tic, torticollis, etc. It is important, however, to bear in mind the original inflammatory nature of many of these affections, as the prominence of such symptoms as paralysis or spasm seems sometimes to mask to the physician the fact that they are dependent upon neuritis or perineuritis, and in consequence appropriate antiphlogistic treatment is neglected, or remedies such as electricity and massage are begun too soon or are used too vigorously. In all forms of local paralysis neuritis after a time results in degenerated or atrophied nerves, with which we have to deal rather than the original inflammation; but the point I wish to emphasize is that for the purposes of treatment the physician should always first consider whether any real neuritis, acute or subacute, still remains.

The most common forms of facial or Bell's paralysis are examples of rheumatic neuritis due to cold or exposure, or they are syphilitic or traumatic. In these cases the importance of early active treatment is not properly appreciated. As soon as a case of rheumatic facial paralysis is recognized treatment by leeches externally, and internally by such remedies as the bicarbonate or citrate of potassium, or by salicylate of sodium, salol, salicin, or oil of gaultheria, or by mercury, particularly in the form of calomel, should at once be instituted; and in addition rest of the face and mental and general rest as far as possible should be enforced. As soon as the most acute symptoms have subsided the iodides should be used, and even after some degeneration has occurred, as some inflammation also usually remains, these remedies in reduced doses should still be continued. Later, electricity, and tonic and reconstructive remedies, such as strychnine, quinine, iron, malt, and cod-liver oil, have their place. In syphilitic facial paralysis—which can often be diagnosticated by the fact that as the lesion is usually intracranial, although peripheral, the auditory as well as the facial nerve is involved—the most active specific treatment by mercurial inunction or corrosive-sublimate injections, or large doses of the iodides, should be pushed. Often a gumma and accompanying neuritis are both present.

The auditory nerve, like the facial, may be attacked by syphilitic disease or may be involved in a syphilitic tumor, and may even, although rarely, be the seat of a primary neuritis.

Oculo-motor paralysis in a large majority of cases is due to syphilis, and frequently the lesion is a primary syphilitic neuritis, although occasionally, as in facial paralysis, the primary lesion is a gumma of the membranes, neuritis accompanying the tumor. The importance both of early and of persistent treatment of such cases by specific remedies cannot be overrated, although, after the paralysis has entered upon its chronic stage, electricity, tonics, and reconstructives must also play an important part. Some authors regard oculo-motor neuritis, like facial neuritis, as usually of rheumatic origin, but this is not my personal experience. When the paralysis is total—that is, of all the branches of the third nerve—it is usually due to syphilis. When the more external branches of the nerve are alone involved it is more likely to be rheumatic. The syphilitic cases do better on mercury and the iodides, while the rheumatic will sometimes yield more promptly to the active exhibition of the salicylic preparations. Mercury and the iodides, however, are useful in the subacute and chronic stages of both rheumatic and syphilitic neuritis of these and other nerves.

Paralyses and sensory affections in the domain of the fifth or trigeminal nerve are sometimes due to primary neuritis, although this form of inflammation is not as common as secondary neuritis associated

with a growth or extension of disease from bone, membrane, or sinuses. Owing to the destructive affections of the eye, such as ulcers or sloughs of the cornea and conjunctiva, the importance of an early recognition of inflammatory affections of this nerve and their aggressive treatment cannot well be over-estimated.

I have seen a few instances of losses and perversions of taste apparently dependent upon toxic neuritis which originated through substances taken into the mouth or from constitutional infection or poisoning. Olfactory disorders are often due to disease of the centre for smell in the cerebrum, or to tumors or other lesions complicating the olfactory bulb, but occasionally are the result of a primary neuritis. In rare instances we have coincident involvement of both the distribution of the olfactory nerve to the Schneiderian membrane, and of the first and second divisions of the trigeminal to the mucous membrane of the nose, the combination giving disturbances, both of the sense of smell and of common sensations. An effort should be made to separate these gustatory and olfactory cases, and if it is determined that they are due to neuritis, particularly of the primary form, a more hopeful prognosis can be given. In such cases we have just as much reason as in a case of diffused or multiple neuritis for the use of such remedies as mercury, iodides, salicylic compounds, and later electricity, strychnine, and other tonics.

Of course optic neuritis in the vast majority of cases is secondary to intracranial disease, particularly tumor and meningitis. It may, however, be a primary affection, and if so is most likely to be of rheumatic origin. Gowers speaks of three instances of this kind, all in women, two of whom had previously suffered from neuritis of the facial nerve, and the other had had manifestations of rheumatism after exposure to cold. The therapeutic importance of such a fact as this is at once evident.

Both the spinal accessory and hypoglossal nerves are sometimes attacked by rheumatic neuritis, most probably in their distribution outside the cranium. Accessory neuritis is not infrequent as an accompaniment of caries of the upper vertebræ, and this nerve, like other nerves of the neck, sometimes is the seat of an inflammation originating from the swellings and suppurations of the cervical glands. Attention to the cause of the neuritis is here of great importance, and active counter-irritation or cold to the neck may be of great service.

The phrenic nerve is so situated that it is not rarely involved in disease of the neighboring parts, as in aneurisms of the large vessels of the neck, mediastinal and other tumors, and diaphragmatic pleurisies. In these cases the nerve may only be affected by pressure or a secondary neuritis may be set up and become serious. The phrenic centre in

the cord is sometimes included in intraspinal disease or injury or is reached by an ascending neuritis. Primary neuritis affecting this nerve is a rare affection, and commonly arises after great exposure of the neck or from toxic or infectious influence. The internal treatment in such a case should of course be the same as that for neuritis of other types, with the addition, however, of remedies such as strychnine and caffeine, and active counter-irritants over the lower or inner portion of the neck, and perhaps also over the diaphragmatic region.

Pneumogastric neuritis, both as an affection secondary to tumors, aneurisms, and other gross lesions, and as a primary disease, is rare, but has been observed; and without doubt this nerve is sometimes invaded in multiple neuritis, the fatal issue being thus sometimes determined in cases occurring after diphtheria and scarlet fever, or from arsenical or other poisoning. Bearing this fact in mind, when cardiac and respiratory failure is threatened in such cases, in addition to the usual treatment for multiple neuritis strenuous efforts should be made to stimulate the nervous centres by such remedies as atropine, strychnine, and caffeine. Digitalis may also prove of service.

Radial paralysis or unilateral wrist-drop is a comparatively common affection, often due to pressure, as from a drunken man sleeping heavily on his arm, but in other cases the result of exposure, and therefore a rheumatic neuritis. Even when induced by pressure some traumatic neuritis is usually present. The median, ulnar, and circumflex nerves are less frequently, and yet not rarely, the subjects of inflammation. In all such cases, particularly in the early stages, the inflammatory nature of at least a portion of the affection must be borne in mind. Treatment with such remedies as massage, Swedish movements, and galvanic electricity must not be begun too soon, although of great value in the later stages of the diseases. Active counter-irritation with mustard, thapsia plasters, or blisters is often of great service early.

The brachial plexus or any one or several of its branches is not infrequently the seat of primary or secondary neuritis. In diabetes I have seen generalized brachial neuritis with pain and tenderness of the most extreme character. In one instance it yielded to large doses of the salicylate of sodium frequently repeated, with complete rest and the hypodermic use, twice daily, of morphine and atropine.

The occurrence and treatment of neuritis involving the lumbar or the sacral plexus, or both of these plexuses at the same time, is a subject which has not received the attention it deserves. Sometimes the sacral plexus, and by extension through the lumbo-sacral cord subsequently the lumbar plexus, become included in neuritis which has begun in the great sciatic nerve and ascended. I have elsewhere[1] considered at some

[1] *Medical News*, June 15, 1889.

length the comparative frequency of the lesions of these plexuses, which embrace cases of spontaneous neuritis and of secondary neuritis, and of pressure disturbances resulting from neuromata, non-neural growths implicating the nerves, aneurisms, abscesses, gunshot and other injuries, and rectal, ovarian, or uterine diseases. In every case of unilateral or even bilateral pain in the extremities the sacral plexus should be examined carefully by palpation through the rectum. Probably some of the cases of anal and perineal neuralgia reported by Mitchell and others have been instances of neuritis beginning within the pelvis or somewhere in the distribution of its nerves. The diagnosis of lesions of either or both of these plexuses having been made out, treatment should be directed to the cause of the neuritis if the nerve-inflammation is secondary, and whether secondary or primary certain special lines of treatment in addition to those ordinarily used may be found serviceable. Among these would be included complete rest in bed, counter-irritation both in the perineal and sacral region, and the administration by the rectum, and sometimes even by the vagina, of narcotic and anodyne suppositories. In several cases of plexus neuritis I have seen persevering mercurial inunction, local rest, anodynes, and tonics dissipate the affection.

Under such names as anæsthesias, peripheral anæsthesias, paræsthesias, numbness of the extremities, etc. are included various forms of neuritis, and these may call for special plans of treatment. Cold, alkaline caustics, strong narcotic solutions, and various kinds of local irritants will set up irritation, congestion, and even inflammation of the peripheral nerves and their end-organs in the skin; so that these anæsthesias and paræsthesias may represent a dermal or a more deeply-extending true neuritis. Laundresses, cooks, washerwomen, and dish-washers, particularly in boarding-houses and hotels, suffer in this way. Motor disturbances are usually absent, the affection being of the sensory or vaso-motor nerves. Various vascular or even trophic phenomena, such as coldness, pallor, blueness, flushing, heat, swelling, ulcers, or abscesses, may accompany the anæsthesias. In or after any infectious or toxic disease, instead of a widespread multiple neuritis or a neuritis limited to some definite nerve-trunk and its branches, we may have cutaneous anæsthesia or muscular anæsthesia, or both combined; as, for example, numbness of either feet or hands, of the tongue, or of the lips. Frequently these sensations are dependent upon mild grades of inflammation, and the best treatment is based upon a recognition of this fact, The affection described as "numb fingers" is probably a slight form of multiple neuritis. Syphilitic neuritis, which usually takes the form of loss of pain and temperature senses, shows a tendency to occur on the breasts and the backs of the hands, although it may appear anywhere. "Numerous cases of indefinite

nervous symptoms," says Starr, "pain of various kinds, formication, and odd sensations grouped under the indefinite terms numbness, flashes of cold and heat, accompanied by actual changes in the temperature of the part or only by apparent vascular irregularities, slight spasms or tremors; functional weakness, with sense of fatigue, not reaching the grade of paresis, and many equally obscure manifestations of disturbed function in various parts of the body, receive their best explanation in the theory of multiple neuritis." [1]

The majority of cases of so-called sciatica are instances of neuritis, often of the rheumatic type, although the occasional occurrence of true sciatic neuralgia has not been thoroughly disproved. In the acute and subacute stages of this disorder the value of rest should not be overlooked. If possible, this rest should be absolute. One of the best methods of accomplishing this is by putting the patient to bed and even applying a splint to the limb—a method first advocated by Dr. Weir Mitchell. Of course in mild cases this is not necessary. In sciatic neuritis, as in many other forms of nerve inflammation, cold is very serviceable, and has been advocated by Mitchell, Jacoby, Graeme Hammond, and many others. Cold can be applied by means of ice-bags packed against the posterior surface of the thigh, as recommended by Hammond, or sprays of chloride of methyl or ether may be used, but the latter have been objected to because of the rapidity with which they produce freezing of the skin. Recent acute cases of sciatica sometimes yield very rapidly to large doses of oil of gaultheria, the salicylate of sodium, the salicylate of cinchonidine, or salol and phenacetin. This treatment is well supplemented by complete rest and one or two injections daily or every other day of morphine and atropine. These are therapeutic facts which suffice to show that the disease is a true neuritis. Chronic sciatic neuritis is better treated by such remedies as Donovan's solution, oil of turpentine, or iodide of potassium or sodium, combined with the salicylate and the bromide of sodium and the external use of strong galvanic currents or vigorous massage. The use of massage in chronic sciatic neuritis is deserving of a few special words. Owing to the deep-seated position of the nerve, it should be vigorous in character, and hacking, a form of strong percussion from the elbow, is sometimes of great service here. Wherever a nerve-inflammation is of moderate or varying grade, but of great persistence, the use of active and skilful massage will often answer a good purpose, and in sciatic and other forms of neuritis, when chronic, strong galvanic currents are of great service.

While nerve-stretching is perhaps more generally useful in neuralgia than in neuritis, it will sometimes be found of service in intractable

[1] The Middleton-Goldsmith Lectures, *Medical News*, during January, 1887.

chronic cases of the latter disease. In a case of localized sciatic neuritis of three years' standing Dr. Deaver stretched this nerve for me with entire success, although the case had resisted most active treatment of various kinds.[1] "Operation is useful," according to Deaver,[2] "in two or three ways—either by allowing the nerve a better chance to repair, by opening the sheath and breaking up any adhesions that may be present, or, when degenerated, by disturbing the molecular condition of the nerve and stimulating it to take on regenerative action; or, again, in those cases of chronic inflammation of a nerve in which physiological movements never allow it to be sufficiently long at rest to accomplish a cure, by removing a section of the inflamed nerve and thus getting rid of the constant irritation."

**Multiple Neuritis.**—The disease known as multiple neuritis is deserving of particular consideration, owing to its extent and peculiarities. As its name indicates, it is a widespread inflammatory affection of many nerves, and may be due to a great variety of causes, but usually is toxic or infectious. Spontaneous or sporadic cases have been frequently reported, but probably in these the underlying cause has escaped discovery. Alcohol is one of its most frequent causes, but lead, arsenic, copper, carbon bisulphide, carbonic oxide, ergot, jaundice, uræmia, diphtheria, scarlet fever, measles, smallpox, typhoid and typhus fevers, tuberculosis, influenza, leprosy, mumps, cholera, syphilis, puerperal infection, rheumatism, gout, and diabetes, have all been recorded as originating it in particular cases.

The symptomatology of this affection is complex. Patients complain of all sorts of pains and abnormal sensations referred to various nerve-distributions, and, it may be, to muscles, joints, and the internal viscera. Coldness, various paræsthesias, impairment of sight and hearing, and constitutional disturbances, such as fever, rigors, and delirium, are often present at the start. The objective symptoms are sensory, special sensory, motor, paralytic, ataxic, spasmodic, electrical, reflex, vaso-motor, and trophic, and do not in essence differ from those which have been already mentioned in speaking of the general symptomatology of neuritis; but they are usually intense in character, widespread, and often eventually such as to threaten the life of the patient. The disease frequently complicates or is complicated by other affections of the peripheral or of the central nervous system, such as myelitis, meningitis, meningo-myelitis, or meningo-meningitis.

Besides the subdivisions into acute, subacute, and chronic, and into etiological varieties, multiple neuritis may be conveniently classified, particularly for the purposes of treatment, into cases of mild, moderate, and severe type. Moderate and severe, but curable, cases may

[1] Deaver and Mills, *Journ. Nerv. and Ment. Dis.*, Dec., 1890.

[2] *Med. News*, Aug. 8, 1891.

be subdivided into four stages, although these stages may vary much in length and in severity. The first stage is that of onset; the second is that during which the symptoms show a tendency to remain at the same plane; the third is that of paralysis and wasting the result of the nerve-degeneration which has followed the inflammation; the fourth is that of convalescence and restoration of lost structure and functions. Some cases of multiple neuritis never pass the first stage. They are explosive, violent, and rapidly fatal, the neuritis extending from the nerves of the extremities to those of the trunk, and even to the phrenic and pneumogastric, ending fatally in a short time from respiratory and cardiac paralysis. The term "apoplectiform" can be properly applied to these cases, and to others which may recover, but which come on abruptly and with violent symptoms.

In the early stage, particularly of severe cases, the treatment should be actively and aggressively anti-inflammatory. The suffering of some of the patients affected with multiple neuritis is almost indescribable, and it is of the utmost importance to relieve them promptly if possible. In the first place, the patient should be put as nearly as may be at absolute rest, in the full meaning of the word absolute. Attention should be paid to the character of the bed, which should not be too hard and should be as free as possible from knots and ridges. Much the same care should be taken with patients of this kind as with cases of fracture: the handling and movement necessary in feeding the patient or in attending to his evacuations should be reduced to a minimum.

In a few cases bloodletting may be of advantage. Before resorting to general bloodletting, however, the patient's general condition should be carefully considered. Many old alcoholics are broken down and would react badly from general bloodletting. A very limited number of cases, however, with sthenic symptoms and with evidences of congestion or inflammation of the brain and spinal cord in addition to the neuritis, can be advantageously treated by careful venesection.

In nearly all alcoholic cases the patient should be at once deprived entirely of alcohol. Occasionally a measure so heroic as this might have some danger in old topers, but in the majority of cases the alcohol should be withdrawn at once, and I have rarely seen any harm result from this procedure. If the use of any alcohol is retained, it will be best given in the form of a weak milk punch two or three times a day. While, however, the alcohol should be removed, the patient should be carefully nourished. In order to accomplish this, the condition of the stomach must be carefully considered.

The symptoms calling for immediate attention are sensory. The pain and tenderness must be relieved. Various local applications have been

recommended and may be tried. One difficulty is the large surfaces which must be covered—entire limbs, and almost the entire body in some cases. Very hot fomentations or poultices can be applied to the limbs every two or three hours for ten or fifteen minutes at a time. Instead of these, rapidly alternating applications of very hot and very cold water may be used, but care should be taken when these are resorted to not to be careless or slow. A large sponge or soft towel is dipped first in very hot and another in very cold water, and one is made to follow the other rapidly up and down the limb. If used properly, this makes an agreeable and useful method of local sedation or counter-irritation.

Opiates in various forms can be used for the relief of pain. One of the best methods of administration is hypodermically giving $\frac{1}{6}$ grain of morphine and $\frac{1}{100}$ or $\frac{1}{120}$ grain of atropine. The hypodermic injection need not be given in the most hyperæsthetic areas. One, two, or three injections a day may sometimes be resorted to with advantage. It is a good plan in the early stage to give an anodyne and febrifuge, as a mixture containing morphine, with citrate of potassium, spirit of mindererus, and camphor-water. If the patient has a weak heart and is broken down from alcohol or other cause, care must be taken in the administration of remedies; and it is well sometimes in such a case to give good-sized doses of nux vomica, strychnine, erythroxylon, or preparations of cinchona. Nourishment in the form of milk, beef-extracts, tender meats, and soft foods generally must certainly be given.

In the early stages particularly, and in any stage in which pain and hyperæsthesia are prominent manifestations, salicylic acid, salicylate of sodium, or some other salicylate, salicin, salol, or oil of gaultheria—all remedies, of course, of the same general character—may be administered with great advantage. Which of these various preparations should be first selected it is somewhat difficult to say. My own preference is to begin with the salicylate of sodium, in a dose of 15 to 20 grains repeated every four hours, or even oftener at first, watching the patient's condition and diminishing the dose if it appears to weaken him. In some cases 30 grains of the salicylate of sodium can be taken as often as four or five times a day, and cause speedy relief of the most painful symptoms. When a rheumatic element is present this treatment is one of the very best. Of the drugs allied to sodium salicylate, oil of gaultheria is next in value. It is wonderfully efficacious in relieving nerve-inflammation, but unfortunately, owing to its acrid properties, it sometimes disagrees with the stomach and may prove depressing, like all the salicylic preparations. It can be used in doses of from 5 to 20 minims. In severe cases of neuritis it is perhaps better to begin with doses of 10 to 15 minims,

administered in an emulsion so as to give a table-spoonful dose. When cerebral symptoms are prominent, it will often be found advantageous to administer bromide of sodium, potassium, or lithium, or antipyrine or antifebrin, in addition to the salicylates or iodides and to the use of opiates and local applications.

In cases with a syphilitic history I have found the best results from the conjoined use of inunctions of mercury and the internal administration of sodium iodide and sodium bromide in doses of from 15 to 20 grains each. Malarial cases should be treated with large doses of quinine and arsenic, or of the salicylate of quinine or of cinchonidine. In lead cases ammonium chloride, and either potassium or sodium iodide, should be resorted to to assist in elimination. Cases due to mercury or arsenic are to be treated on general principles, eliminating or constitutional remedies not proving so serviceable. In lingering chronic cases hypodermic injections of strychnine should be tried.

Baths, warm, hot, electrical, or medicated, are useful in the subacute or chronic stage of multiple neuritis. These should be used as often as possible, but always carefully, not unduly exposing the patient in a cold room or allowing the limb to grow cold or to remain too long wet. The baths may be either local or general—the feet or a limb may be placed in the warm or hot water or the whole body may be carefully immersed. Ordinary warm baths are best used at night and will help the patient to sleep.

Massage and Swedish movements are remedies of great value if used in the appropriate stages and in the correct way. In the first place, it is not well either to begin too early or to wait too long. In the most acute stage or in the most severe varieties of multiple neuritis even the gentlest massage would be practically impossible. The patients can scarcely endure to be touched, let alone to have stroking, kneading, etc. employed. On the other hand, it is not advisable to wait until all pain and tenderness have disappeared. When the superficial tenderness and the extreme pain have subsided massage should begin, and it should at first be of the gentlest character and only for a brief time; gradually both the thoroughness and the length of the treatment should be increased, until eventually massage in all its varieties—stroking, friction, kneading, and percussion—should be thoroughly employed over a period of at least an hour. It is in the stage of subacute or chronic neuritis that the duration of the entire case can be largely modified by massage and galvanism.

Anodyne and resolvent ointments may be applied by means of massage. A good ointment to use for the relief of pain and for actual effect upon the neuritis is aconitine ointment or aconitine made up with lanoline. Even small quantities of mercurial ointment or a mixture of mercurial and belladonna ointments may be

used in this way. Morphine, atropine, hyoscine, etc. may be added to the oleates or to vaseline. Liniments made up with oil may be used during a whole or part of the general massage. Thus, sweet oil, cocoanut oil, etc. may be combined with tincture of aconite-root or chloroform, or the oil of origanum may be used in some combination in a liniment.

If the patient stands it well or is improved by means of massage, either simple or medicated, in the course of two or three weeks, Swedish movements, at first of the passive and later either of the duplicated active or of the independent active variety, can be used. Just how far these may be employed with advantage can be told by a masseur or a masseuse of tact and experience. Returning movements are to be coaxed, the will is to be trained back into the muscles, contractures are to be carefully overcome—in fact, the patient's unfolding neural and muscular powers are to be encouraged and helped onward. With massage, Swedish movements, and electricity properly employed the length of the period of recovery and restoration may be decreased by weeks or even by months.

Electricity is used in several ways for as many indications. In the very acute stages it should not be resorted to at all; but when the excessive pain and hyperæsthesia have in a measure subsided, mild galvanic currents, uninterrupted and passed through a sponge or absorbent cotton electrodes of two or three inches in diameter, are sometimes beneficial, even in the relief of the pain and inflammation. Experience should guide in this matter. If a patient is made worse by one or two mild applications, further treatment should not be given up entirely, but should be postponed for another week or two. This use of galvanism with weak currents and large electrodes is for anodyne purposes. The Adamkiewicz's electrode for the application of such remedies as chloroform by means of electricity is worthy of trial. After the active inflammation has largely or altogether subsided, electricity, either in the form of galvanism or faradism, will assist in the restoration of the degenerated nerves and muscles.

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## BERI-BERI.

Beri-beri is a term used in certain parts of the East Indies to describe an endemic or epidemic affection, chiefly a multiple neuritis, in which the phenomena are œdema and paralysis of the limbs, with marked pain, paræsthesia, and hyperæsthesia, followed by marked anæsthesia, lost knee-jerk, and changed or lost electrical reactions. The disease is usually described as having two forms—the paralytic

and the hydropic or œdematous, or sometimes a combination of both, and the majority of the cases are of the hydropic or œdematous variety, with paralytic symptoms. It may be either acute or chronic, and sometimes the acute variety is rapidly fatal, unless treated aggressively, and even in spite of treatment. Effusion frequently takes place in the serous cavities, and the heart is decidedly affected. The chances of recovery are better in the paralytic form, because the danger of death is less from dropsy, pulmonary œdema, or cardiac paralysis.

Wernich, according to Weintraub, recommended puncturing the skin and tapping to relieve hydrops, but such measures are not to be recommended. Weiss, Lodewyks, and others recommend the muriate of pilocarpine subcutaneously, the latter claiming for it marked diuretic as well as diagnostic properties. Digitalis, because of the degenerated heart-muscle, must be given cautiously for the relief of the palpitation. Claret and cognac are given to stimulate and assist digestion. As long as the patient is able moderate outdoor exercise is urged, and after that electrical stimulation of the muscles. In the death agony stimulants are given. More important than all is the removal of the patient quickly from the endemic region to a mountainous district where the disease has never existed. Prophylaxis is the only way in which to meet this disease with success.[1] Many of the suggestions with reference to multiple neuritis in general will apply to beri-beri.

[1] Mills and Lloyd, *Annual Uni. Med. Sci.*, vol. i, 1888, pp. 138, 139.

# DISORDERS OF SLEEP.

By LANDON CARTER GRAY, M.D.

## Insomnia.

At the very outset of this subject we are met by the query as to what we know of the exact molecular alterations in the brain that constitute sleep, and to this our answer must be that we know absolutely nothing. There have been all sorts of theories, to be sure, as to the *rationale* of sleep, but they have been pure theories. Durham, Hammond, Mosso, Veit, Pettenkoffer, and others have thought that sleep was due to anæmia, or, more properly speaking, to ischæmia, of the cerebral substance or to a diminished use of oxygen in the cortical cells. But no one has made the slightest effort to show whether these phenomena are cause or effect; nor is it possible in the existing state of our scientific apparatus to know anything more, for the molecular changes that take place in purely functional phenomena can never be known until we have reached such a point in our scientific development as to be able to plunge some instrument into the brain and study the action of the living cell. It must be remembered that the cortex of the brain, some alteration in which probably produces sleep, is a wonderfully complex structure. Seven or eight layers of cortical cells have been described, each differing as much from the other as the cells of different organs differ from each other, and we know absolutely nothing of the function appertaining to each layer of cells, except that there is a probability that certain of the larger ones—the so-called ganglion-cells—are possessed of nervous functions.

At the very beginning, therefore, we must look squarely in the face the unwelcome fact that sleep and its derangements must be studied from a purely clinical, and therefore somewhat empirical, point of view, and that in order to combat insomnia intelligently we must study the conditions of disease in which it is manifested. Limiting ourselves in this manner, we find that insomnia is caused by—

1. The passions, especially worry, anxiety and grief;
2. Pain;
3. Febrile disorders;
4. Neurasthenia;

5. Certain insanities;
6. Certain organic diseases of the cerebrum;
7. Certain drug or food substances.

The treatment of insomnia will vary very greatly according to its being produced by one or the other of these causes, with which it will be best to deal separately.

At this point it may be well to dwell for a moment upon the means at our disposal for inducing sleep, and especially upon the different hypnotics now in vogue—namely, chloral, sulphonal, chloralamid, urethan, and paraldehyde. I have ranked these in the order in which I consider them most efficacious. In my hands chloral hydrate is the most effective of them all, but it is a drug which I rarely employ, because of the depressing effects it is likely to induce, especially if long continued. Sulphonal is the hypnotic which has acted best, by all odds, in my hands, although I seldom give it alone, but usually in combination with bromide, or, as I shall have occasion to indicate later on, with opium. Ten grains of sulphonal, with 10 or 20 grains preferably of the bromide of potassium, is an effective sleep-producer in the majority of cases, and the dose of sulphonal can be increased, if necessary, to 20 or 30 grains, although it is seldom necessary to give more than 20 grains of bromide. Sulphonal should always be given about an hour before bed-time, best in a cup of bouillon, soup, milk, or chocolate. In my experience it is not absorbed for an hour or so, and its maximum effects are produced three or four hours after it is taken; so that it is not a reliable drug to produce sleep quickly, for which purpose I prefer chloralamid. The dose of chloralamid should be much larger than that of sulphonal, and I never give less than 30 drops at the outset, and frequently 40 to 60. The objection to it is in its taste, which I disguise by giving it in capsules or tincture made with some bitter substance. In many cases, when it is necessary to induce sleep immediately, and when the sulphonal alone or with the bromide will not do this, I use chloralamid first, and then instruct the patient to take the sulphonal when drowsiness is beginning. Urethan in my hands has not been a reliable drug except in the very mildest forms of insomnia. Paraldehyde is ranked by some authors as a very effective hypnotic, but I have not found it reliable, perhaps because my use of it has been limited on account of the very unpleasant mawkish odor of the breath that it is apt to induce in certain patients when continued. This odor cannot be removed by any means that I have tried, although the tincture of bitter orange-peel has been vaunted against it: this, however, I have found to be perfectly useless.

Aside from the use of these hypnotics pure and simple, we can in some certain cases induce sleep by mental and physical repose,

by hypnotism, by cold and warm effusions, by electricity, by change of scene and surroundings, by travel, by massage, and by stimulants.

Probably the most intractable of all forms of insomnia is that caused by the passions. In such cases it becomes a matter of infinite tact to know how far it is best to use a pure hypnotic and to what extent it is wise to accustom the patient to the use of such drugs. Usually, however, sleep can be at least temporarily induced by the employment of the bromides in combination with one of the pure hypnotics. Isolation that shall conduce to mental and physical repose will of course be of very great aid, but, after all, there is no means save time of lessening the perturbation of a great passion.

The insomnia produced by pain usually proceeds from neuralgia, neuritis, the early stage of pneumonia or pleurisy, peritonitis, the early stage of certain acute pelvic affections in the female, articular and muscular rheumatism, certain painful affections of the eye, certain infectious disorders, especially influenza, intracranial tumor, cerebral meningitis, and intracranial syphilis.

In all these conditions the rule should be to ascertain, first, how far the pain can be controlled by the proper treatment of the disease, and then how far sleep will come when the pain is relieved. In no case, however, should analgesics and hypnotics be used except as adjuvants to the proper treatment of the disease causing the pain and indirectly the insomnia. Then the next consideration should be as to whether the pain is acute, subacute, or chronic; for while it may be permissible, and often necessary, to use analgesics and hypnotics for the relief of pain that is acute and of short duration, it might be very inadvisable to use hypnotics and analgesics in chronic cases. In one disease, however, intracranial syphilis, it is perfectly useless to attempt to overcome the pain or the insomnia except by means of iodide, with or without mercury; and this should never be forgotten. In neuralgia the cause of the pain producing insomnia should always be carefully sought for, and it is generally to be found in a condition of malnutrition or some direct or indirect irritant. In the case of malnutrition the pain and the resulting insomnia should first be treated by means of rest, abundance of good and varied food, with milk and beef-tea. The average adult individual should take at least three full meals a day, with two quarts of milk in the twenty-four hours and a pound of beef made into beef-tea, and to this it is generally advantageous to add two ounces of a good malt extract at each meal. This amount of food should be gradually reached in the course of ten days by first insisting upon three meals a day, then adding the milk, beginning with one tumblerful every three or four hours and rapidly increasing in two or three days to two quarts, and then the beef-tea should be added. When all this is successfully taken the

malt extract should be prescribed. It will usually be difficult, however, to continue the beef-tea or beef-extract for any great length of time, as few stomachs can take it long. With this diet should be conjoined rest to the extent that the unfavorable condition of the patient may demand, varying from absolute rest in bed at first to staying in bed until noonday, or resting for a few hours every day, or going to bed simply after dinner, staying there until the next morning. Every case of neuralgia that is not due to a direct or reflex irritant should be treated by means of such combination of rest and dietetics, to which in many cases it may be useful to add iron, either the dialyzed or the albuminate of iron, in 2- to 3-drachm doses three times a day, given in a cup of water after meals. But if neuralgia is due to a direct or reflex irritant, it will have been caused by either a neuroma, a cicatrix, a mass of callus, an inflamed joint, a pulmonary or abdominal adhesion, an inflamed viscus, a lesion of the nasopharynx or of the ear or of the eye (either error of refraction or muscular insufficiency or direct ocular lesion), nephritis, lithæmia, gout, anæmia, or leucocythæmia; and all of these should be carefully sought for and treated, if present, before the pain and insomnia are directly treated. In many of these cases, therefore, it will happen that the pain and the subsequent insomnia will cease without the direct need of any analgesics or hypnotics; but if this should not be the case it may become necessary to relieve the pain absolutely; and this should be done by means of quinine in 2- or 3-grain doses, in combination with a reliable and fresh preparation of salicylate of sodium, in 2- or 3-grain doses two or three times a day; or, if this will not answer, phenacetin may be added; or it may even be advisable to try antipyrine in doses of 10 to 15 grains; but I am very much opposed to antipyrine, because of its depressing effects, of which I have seen some sad examples, and I should therefore not advise its use even in the most robust individuals except temporarily. Blisters along the course of the affected nerve or occasional cauterization with the Paquelin cautery will often be found of great value. Exalgin has not proved reliable in my hands. If morphine is to be used, it should only be for the control of acute pain that cannot otherwise be relieved, and then it should never be given except by the physician himself. I am not one of those who place much credence in the sensational stories about the formation of opium-eaters by physicians, for I believe that when a man or a woman becomes an opium-fiend it will be found in the vast majority of cases that there is an original defect in that man or woman which would have led them to form this or some other habit upon favorable opportunity; for I know of no reason why all of us cannot steal or forge, or take opium or hasheesh, or gamble or lie, or do other things which the moral sense of civilization

condemns, unless it is that we have within our brains and spinal cord that restraining force which physiologists call inhibition and the theologists call conscience; and the individual who forms the opium or any other drug habit is usually one of these afflicted with an hereditary or personal predisposition of this kind. I should therefore not use opium in one of this class, but I should use it freely in one who is not of this class for the relief of acute pain. If hypnotics are needed after all, sulphonal or chloralamid is usually the best. Of neuritis the same remarks may be made as of neuralgia.

In the early stage of pneumonia and pleurisy the pain and insomnia may often be relieved by hot fomentations, an oil-skin jacket, and rest in bed, without resort to analgesics or hypnotics; and either analgesics or hypnotics should be administered with very great regard to the condition of the heart and the extent of implication of the lungs; and, indeed, in all cases it will be best, if possible, to rely upon the effects of stimulation by means of egg-nog, milk punch, and some light food substance at bed-time rather than upon pain-relievers or sleep-producers. If hypnotics have to be used, sulphonal and chloralamid are again the best.

In peritonitis opium can be used with a far freer hand than in the pulmonary affections, for the well-known reason that it restricts the friction of the peritoneum, and it may be quite sufficient to relieve the insomnia. If not, hypnotics must be used, and I know of no particular choice among them except for the general reasons that have been stated in the introductory paragraph.

These same considerations apply to the treatment of acute pelvic affections of the female.

In acute articular rheumatism the salicylates, alkalies, lotions, and rest will usually be found to be of more value for the relief of pain than morphine or the other analgesics; and therefore, if the insomnia is not relieved by the former means, use should immediately be made of the hypnotics proper, but these of course should only be used so long as the cases are acute, and should be withdrawn as the case becomes chronic, when the continuance of insomnia should be met by some light food or stimulant or with massage or gentle faradization at bed-time. The insomnia caused by the pain of articular rheumatism should never be treated by morphine or opium unless it is very acute, when it may have to be met temporarily in this way; but in the vast proportion of cases hot applications, galvanization, faradization, massage, salicylate of sodium and rest will suffice to overcome the insomnia if the causative disease is properly treated.

In some acute affections of the eye the pain may be so sharp as to cause insomnia, and in such conditions the relief of pain by means of cocaine will usually be all that is needed, although it may happen

that morphine will have to be used. If we could use cocaine with such instantaneous effects about other parts of the body as we can about the eye, we should have at our disposal for general analgesic purposes a drug of far more potency than any of which we can now boast.

Certain acute affections of the ear causing sufficient pain to produce insomnia must of course first be treated, so far as is possible, by relief of the particular lesion presented, but if then the insomnia and pain continue, the former will generally disappear with the latter, so that analgesics—best of all morphine—will be all that is needed. If the condition should, however, become chronic, then some less dangerous pain-reliever should be used. In some irritable and hysterical individuals, however, a very slight irritation of the internal auditory meatus in the form of some little ulceration will often cause considerable pain and insomnia, both of which may be relieved by treatment of the cause.

When certain infectious diseases cause pain, and secondarily insomnia, it may happen that analgesics alone may relieve, or, as is generally the case, both analgesics and hypnotics will have to be employed.

Intracranial tumor seldom causes insomnia unless it is syphilitic; indeed, there is often a tendency to too much sleep, verging upon coma rather than insomnia. If, however, insomnia should result, this fact of itself should render us suspicious of intracranial syphilis, and careful trial should therefore be made at once of large doses of the iodide, commencing with 30 drops of the saturated solution of the iodide of potassium, given every four or five hours in a full tumbler of water or Vichy or Geisshübler, and increasing the dose every day by 3 to 5 drops at each dose until 100 or 200 grains have been reached in cases that have not been treated before for syphilis, and in cases that have been treated before for syphilis until a dose shall be reached that is fully double the maximum of what they had ever taken before. I do not have much faith in the use of mercury in intracranial tumors of syphilitic origin or of intracranial syphilis. In few of these syphilitic cases will hypnotics or analgesics be found of any use.

The pain of cerebro-meningitis can usually be better treated by ergot, bromide of potassium, and iodide of potassium than by analgesics, and these will often be sufficient to relieve the insomnia if it is dependent upon the pain: where this is not the case or where the insomnia is a symptom *per se* of the meningitis, hypnotics must be used; and of these I think that chloral is usually by all means the best if the cardiac condition of the patient will warrant it.

The insomnia of febrile conditions will generally require the use of hypnotics, and the hypnotics used should be governed by the strength

of the patient. I prefer sulphonal in these febrile conditions—10 grains of it with an equal quantity of bromide—and, if necessary a small quantity of opium or morphine, the latter hypodermically. The sulphate of quinine or strychnine can be given with advantage in asthenic conditions. Nevertheless, in none of the febrile conditions should the hypnotics be used, in my opinion, unless the effect of alcoholic stimulants and the bromides has first been tried. Great care should be taken not to render the patient dependent upon any hypnotic.

In neurasthenia insomnia is not apt to be a frequent condition, for I think that most cases of so-called neurasthenia with obstinate insomnia are really simple melancholia, with the diagnostic symptoms to which I have lately called attention, and to which I shall again allude. It may happen, however, that neurasthenia will be accompanied by a slight degree of insomnia, and then it should first be determined as to whether the neurasthenia is reflex, lithæmic, aural, or simple neurasthenia. By reflex neurasthenia I mean that form which results from a well-marked lesion of some non-nervous viscus, such as a nephritis, a gastric lesion, a hepatitis, a naso-pharyngeal lesion, or possibly an error of refraction or insufficiencies of the ocular muscles. In any of these cases the reflex irritant cause must first be removed, although I may say, in passing, that too much stress should not be laid upon slight conditions of non-nervous organs as possible reflex causes, and the connection between cause and effect should be carefully demonstrated before a positive conclusion is reached. By lithæmic neurasthenia I mean that form of neurasthenia which has symptoms of vertigo or tinnitus aurium, numbness, and tingling in the extremities or throughout the body, and perhaps susceptibility to odors, irritability, and nervousness, etc., and in which slight disturbances of digestion or urine charged with uric acid is found, and in which treatment by rest, alkalies, acids, laxatives, and digestives is indicated. By aural neurasthenia I mean a form of neurasthenia which has never been described, to my knowledge, caused by a chronic disease of the middle or internal ear, and which induces a high degree of nervousness, irritability, enormous susceptibility to sounds, and sometimes slight insomnia. By simple neurasthenia I mean that form in which there is only a marked depression of the vital forces, with the symptoms that characterize the reflex and lithæmic and aural types. In all these forms of neurasthenia the underlying disease must be treated, and most relief will be obtained from dietetics and rest rather than hypnotics. Neuralgia and neurasthenia of the simple variety are best treated in the way that I have indicated in the foregoing paragraph when speaking of neuralgia. If the insomnia should not be relieved by this general treatment, a glass of milk or a cup of cocoa or a half ounce of whiskey in a milk punch

or egg-nog or in water, as the patient may desire, should be given at bed-time, with, possibly, in those who can digest food, a light supper.

In certain exhaustive diseases, such as typhoid fever and anæmia, hypnotics should never be used until they become absolutely necessary, as continued doses of heart-stimulants through the day, with or without quinine, and proper support throughout the twenty-four hours with alcoholic stimulants, with an extra dose just before bed-time in the shape of a milk punch or egg-nog, will usually answer every purpose; and I have seen hypnotics produce very disastrous results in such cases. If it becomes necessary to use them, a second dose should never be given until the effect of the first one has been observed by the attending physician, and only very moderate quantities should be employed.

I have had occasion to call attention to a certain group of symptoms as diagnostic of simple melancholia—namely, melancholia, obstinate insomnia, and a peculiar sensation to which I have given the name of the post-cervical ache, which is located in the occiput and upper cervical spine, and which is differently described by each patient. By means of these symptoms a positive diagnosis can be made between a commencing melancholia and a simple neurasthenia. The insomnia of this form of disease should never be mistaken for the insomnia from the other causes which I have enumerated, and attention to the presence of the post-cervical ache and the peculiar melancholia should prevent any confusion in diagnosis. The treatment of this form of insomnia is the treatment of this form of melancholia. In all these cases I put the patient upon opium, preferably the aqueous extract, $\frac{1}{8}$ grain, and I give this quantity once, twice, or thrice a day according to the depth of the melancholia. At bed-time I combine this same quantity of opium with 10 or 15 grains of bromide of potassium and 10 grains of sulphonal, and give it in the manner I have said that I prefer to give sulphonal. The post-cervical ache I treat by the use of the galvanic current, one large electrode being placed upon the nape of the neck and another upon the brow, a current of one or two milliampères being very gradually turned on and allowed to pass from three to five minutes, and then turned off with equal care. These electrodes should be made of good malleable copper, the size of the one over the nape of the neck being about three by seven inches, and that for the brow about two by five and a half inches. Each should be provided with a handle seven or eight inches in length, so that it can be easily maintained in position, and it should be covered with absorbent cotton thick enough to protect the skin, especially at the edges of the electrode, from the burning effect of the copper when charged with electricity; and this absorbent cotton should be kept in place by muslin or linen sewed over it, so that the whole covering can be put on fresh whenever soiled; indeed, I make it a rule

to have my cotton and linen changed every day. Before being placed on the neck and brow these electrodes should be dipped into hot water, so as thoroughly to saturate the cotton and linen—hot water being preferable to cold because a galvanic current passes through it more readily—and then they should be quickly squeezed dry so as to prevent any dripping. The current should be measured by means of a milliampèremeter and regulated by a rheostat, and it should never be administered for this purpose without these indispensable instruments, inasmuch as a difference of two or three milliampères makes the difference between success and failure of treatment. Any good galvanic battery will furnish the current, and of the ordinary portable cells a half dozen to a dozen will furnish current enough. In general paresis hypnotics may be needed, but usually the administration of hyoscine, $\frac{1}{100}$ grain, or hyoscyamine, $\frac{1}{100}$ grain (far preferably the former, because it is much less depressing), together with 10 to 15 grains of the bromide of potassium, will often be sufficient, when given two or three times a day, to quiet the patient and overcome insomnia. Should this not be the case, it will usually be because the excitement has not been overcome, and then it will often be wise to make use of sulphonal in 5- to 10-grain doses two or three times a day, the last dose being given at bed-time with or without hyoscine or the bromide of potassium; but this should only be done with robust individuals, or if temporarily done with others the heart should be watched carefully, and in all cases it is usually best to give tonic doses of quinine.

In the acute forms of insanity, such as hallucinatory insanity or acute paranoia, insomnia is not usually more than a temporary symptom, and it can be best overcome by any one of the hypnotics. Insomnia of the chronic insanities at certain times of the month or at certain periods of the year becomes a feature, but it is scarcely worth while to interfere with it unless it becomes very marked and disturbs the patient's nutrition; in which case it will be best overcome with hypnotics given with a light supper at bed-time, and even with some alcoholic stimulant in debilitated cases.

Certain organic diseases of the cerebrum may produce insomnia, such as tumors, the different forms of meningitis, abscess, chronic arterial disease, but in these maladies there is more of a tendency to too much sleep, frequently bordering upon coma, rather than to insomnia. In one organic disease of the brain, however—intracranial syphilis—as I have pointed out, the insomnia in the early stage is apt to be very obstinate, and is accompanied by quasi-periodical headache, the quasi-periodicity being generally nocturnal, although it not infrequently comes in the afternoon or morning; and the headache and insomnia cease abruptly upon the supervention of any hemiplegic or convulsive symptoms. In intracranial syphilis the insomnia is never affected in the

least by hypnotics, whilst administration of the iodide of potassium in sufficiently large doses will invariably relieve it; and for this purpose use should be made of the saturated solution of the iodide, beginning with 20 drops after meals in a full tumbler of water or Vichy or Geisshübler, and increasing rapidly by the addition of 5 drops each day to each dose until the insomnia and the headache yield or until iodism has been produced. No arbitrary dose short of these effects should deter one in the administration of the drug. As a matter of fact, it will usually require from 100 to 200 grains daily for a person who has not been accustomed to much iodide, whilst in old syphilitic cases it will require much larger doses, one in my experience having needed 600 grains in the day. When the iodide is given in these large doses, as I have directed, it is very seldom that any unpleasant symptoms arise from the stomach or the skin. Mercury I have little faith in in intracranial syphilis, and I never use it in these insomnic cases unless I am unable to push the iodide far enough, when I endeavor to increase its effect by means of the mercury, although I firmly believe that for some unknown reason iodide is much more effective in these cases than mercury.

Excluding the insomnia which is caused by the passions, pain, certain exhaustive diseases, simple melancholia, certain chronic insanities, and intracranial syphilis, the most common cause is to be found in the use of certain drugs, stimulant narcotics or foods; and insomnia from these three latter causes is much more frequent than is generally imagined. We are all familiar with the effect of coffee in producing sleeplessness, and yet there seems to be an idea that coffee can be drunk *ad libitum* in the morning if it be avoided at night. I have found that many individuals have sleeplessness which is produced by this cause. Tobacco in some susceptible individuals will produce insomnia when used in any form, and the only safety for such persons is to eschew it altogether. I am inclined to think that the number of such people is larger than is generally supposed. Tea is also a substance that will produce insomnia, although not in many cases. Some individuals have a susceptibility to certain kinds of wine, so that one individual cannot drink champagne for this reason, another cannot use burgundy, a third cannot make use of brandy, and a fourth cannot drink port.

## Coma.

Coma may result from—

Trauma;
Nephritis;
Alcoholism;
Diabetes;
Cerebral hæmorrhage;

Epilepsy;
Migraine.

In every case the treatment of the coma will materially depend, of course, upon the cause, so that the diagnosis of the latter should be carefully made.

In trauma the patient should be allowed to recover from the shock of the injury, which should be remedied as soon as possible, so that fractures of the bones of the extremities or trunk or skull or cord should be properly set or prevented from complicating matters by pressing upon the viscera which they should shelter.

In nephritis the patient should be placed in a sweat and purged freely, best by $\frac{1}{4}$-grain doses of a reliable preparation of elaterium or croton oil, 1 to 2 drops at a dose, at the same time that a profuse perspiration is induced either by a hypodermic injection of pilocarpine or a full dose of jaborandi.

In the coma of alcoholism there is, of course, nothing to be done but to sustain the patient's strength, if need be, and wait until the effect of the alcohol has passed away.

In diabetic coma free purgation will be most effective.

In the coma of cerebral hæmorrhage a careful inquiry should at first be made to ascertain whether it is the cerebral hæmorrhage of nephritis or chronic endarteritis, of general paresis or some structural intracranial disease, such as disseminated sclerosis, tumor, etc. The diagnosis of nephritis can always be made by examination of the urine and possibly by œdema of the eyelids, feet, and hands. The diagnosis of chronic endarteritis can be made by the exclusion of nephritis, by the presence of tortuous and rigid arteries, and by a hypertrophied heart and the age of the patient. The diagnosis of disseminated sclerosis may be much more difficult without a history having been obtained of the patient before the coma supervened, although the fact of the patient being a youth or young adult with a tremor may lead to a suspicion of the cause.

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## NIGHT-TERRORS.

When a child has night-terrors, as is well known, it starts up in its sleep with a cry, the eyes staring, the face twitching, and seems to be alarmed, whilst no persuasion or soothing has anything more than a slight effect, the child being really in a condition analogous to that of the somnambulist, with the difference that the attack is temporary and does not lead to perambulations. These troubles are very apt to

have the same causes as somnambulism—namely, predisposing ones of heredity, bad health, indigestion, constipation, worry, anxiety, and exciting ones of over-eating, intestinal parasites, mental strain, etc. But night-terrors are much more manageable than is somnambulism. They can best be treated by means of bromides, belladonna, warm baths, electricity, removal of any indigestion, and circumcision. When the bromides are given they should be used in doses of 10 to 30 grains, according to the age of the child, and administered an hour or so before bed-time. The dose of belladonna should be sufficient to cause moderate dilatation of the pupil the next morning and slight dryness of the throat, although it may not be necessary to have these effects of the drug continue throughout the day. Occasionally a tepid bath every second night at bed-time will answer the purpose. Electricity is not usually of great value in this malady, although it will occasionally do good. I prefer general faradization, which can be best employed in these cases by having the whole body faradized, with a gentle current just strong enough to be perceptible, by a nurse or mother just before the child goes to bed. For this purpose any good electric battery will answer; it should have two electrodes about two inches in diameter covered with absorbent cotton, which should be well soaked in warm water before being used; and these should be kept about two inches apart, whilst about fifteen to twenty minutes is taken to go over the surface of the body. Any causes of indigestion in a child with night-terrors should always be removed, and in all cases it is well to have the evening meal a light one. Circumcision is generally of very great avail in cases of night-terror, although its effect is only temporary in other forms of nervous disease, yet the temporary effect in so functional a disease as this is quite sufficient to constitute a cure. It may even be done with benefit in cases in which there is phimosis or redundant prepuce.

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## SOMNAMBULISM.

Somnambulism is a curious phase of nocturnal cerebration that is most analogous to the condition which is produced by hypnotism, whilst its next closest analogy is to the double consciousness occasionally observed in epileptics.

It is not necessary to define in a work of this kind so well-known a malady as somnambulism, or to multiply instances of how intelligent somnambulists may be. The etiology of somnambulism is very obscure, but in a certain proportion of instances the predisposing causes have

been found to be a neurotic heredity, over-strain, enfeebled digestion, poor health, whilst the exciting causes in a certain number of instances are heavy meals, mental tension carried up to the point of going to bed, grief, anxiety, intestinal parasites, overheated or illy-ventilated rooms, and I have also seen a case seemingly produced by the use of tobacco by a young boy.

In the treatment of somnambulism a search should be directed for the predisposing and exciting causes, and if any such can be found they should be carefully removed. In addition certain remedies will often be used with effect if the somnambulistic attacks recur with any regularity. Sometimes a lukewarm bath given at bed-time will answer, or a full dose of the bromides, 10 to 40 grains at the same time, or some means may be taken to break up the attack when it does occur, if possible without wakening the patient. In some schools where somnambulism has shown a tendency to spread among the inmates the plan has been adopted with success of putting a tub of cold water at the bed-side in such a position that the somnambulist would have to step into it in getting out of bed. In one school an epidemic of sleep-walking was nipped in the bud by the schoolmaster pouring two buckets of cold water over one of the boys as he was commencing his nocturnal tour; and this not only cured this boy, but prevented the others from following his example. In another instance, also cited by Tuke, a suggestion is made to a boy before going to bed, as if he were a hypnotized individual, to the effect that this disturbance at night must not again occur, and although the boy may protest that he knows nothing about it, the suggestion is often quite sufficient to prevent further attacks. Sometimes a light placed in the room of the somnambulist will answer the purpose; sometimes placing obstacles around the bed will be sufficient. Occasionally a sound whipping has cured the habit, or sleeping in a room with another person of calmer temperament. My experience with somnambulism has been that every means should be taken to have the patient sleep in a well-ventilated room at a moderate temperature, under light but sufficiently warm bed-clothing, and that the room shall be so placed in a house, if it is in the city, as to be perfectly quiet: if the child is nervous, a person in whom he has confidence should sleep with him; that the evening meal should be light, with nothing that will cause any indigestion, for which purpose some knowledge of the child's idiosyncrasies must be gained, and the evening before going to bed should be carefully passed in some non-exciting, pleasant occupation. In addition, every measure should be taken to build up the general health without doing anything that shall in any way excite the nervous system.

# HEADACHES AND NEURALGIA.

By WHARTON SINKLER, M. D.

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Headache is common in all disordered conditions of the system, whether acute or chronic. It may be a symptom of brain disease or a forerunner of fevers. It is common in diseases of the digestive organs, and it often occurs in kidney disease. In fact, it may happen in the progress of almost all acute or chronic diseases at some time in their course, or may precede them. Many theories have been suggested as to the nature of the pain in headache—the structure in which it is situated, whether external to the skull or internal, whether due to vascular changes or to disturbances in the nerves themselves. The inability of patients to locate the seat of pain when suffering from an attack of headache shows the difficulty of determining the tissues involved.

In organic headaches—as, for example, those from tumor—the pain does not always correspond to the location of the growth. A tumor in the occipital region may cause persistent frontal pain. The truth seems to be that there are many different forms of headache in which the pain is situated in different structures.

In rheumatic headache the pain is external, and is probably seated in the muscular portion of the occipito-frontalis and in the fibrous tissues of the scalp. In the headache of meningitis we have an example of pain in a structure within the cranium.

Niemeyer was of the opinion that in most headaches the pain was in those branches of the fifth nerve which are distributed to the dura. Hamilton,[1] however, is of the opinion that generally headaches are due to over-distension of the blood-vessels distributed to the brain. While it is no doubt true that there is undue fulness of the cerebral vessels in headache, there is something more than the pressure of blood which causes the pain. Whenever the head is held down there is engorgement of all the vessels of the scalp and brain, but this does not cause pain under ordinary conditions.

I recently examined a man in whom the skull had been trephined three years ago for the removal of a tumor as large as a hen's egg. There is now an opening in the skull about three inches by two and a

[1] *Modern Treatment of Headaches.*

half inches, and the brain is covered by the dura only. When the patient holds his head down the vessels in the dura can be seen to become swollen, enlarged, and pulsating, but he does not have pain. The patient also suffers from attacks of headache which are quite severe and frequently last for a day; so that in this case the large trephine opening in the skull, which is certainly sufficient to prevent any undue blood-pressure, does not obviate the pain of the headache.

For the production of pain there must be a hyperæsthetic condition of the nerves, either the sympathetic nerve-filaments or the branches of the fifth which are distributed to the dura; and it is then that the pressure of the blood against these may cause pain.

It is doubtful if the fact of the brain being in an unyielding case has anything to do with the degree of pain felt. We know that large tumors of the brain may gradually grow without being accompanied by pain, and in cases in which there has been an artificial opening made in the skull the patient may continue to have the same kind of headache as before, as in the case referred to above. The dura mater, as already mentioned, receives branches from the fifth nerve, and is the only intracranial structure which is supplied by a sensory nerve. Fibres of the sympathetic have been traced into the pia, and the blood-vessels throughout the brain are accompanied by branches of the sympathetic.

Gowers[1] remarks: "The cerebral substance seems, under normal conditions, to be destitute of sensibility, but from this fact the assumption has been perhaps too hastily made that it cannot be the seat of pain when disordered. It should be remembered that the normal sensibility of the peritoneum would not prepare us for the intense pain of peritonitis." We should remember that all pain must be received by the individual through the activity of certain nerve-cells in the cerebral centres. In neuralgia of the extremities those cortical cells are concerned which receive impressions by the fibres through which sensory impulses pass from the periphery.

The same relations exist in the head. The nerves which are irritated convey the impression to those cells in the cortex which are connected with the afferent nerve-fibres from the membranes. We do not know whether there is the same connection between the cells in the cortex of the brain.

Gowers[2] says: "Sympathetic nerve-fibres accompany the arteries of the cerebral substance, and there is reason to believe that the functional state of the cortex influences the state of the arteries, as is the case in all other organs, and there must be a relation of the cells of the cortex to the vaso-motor centre. Now, it is quite possible that

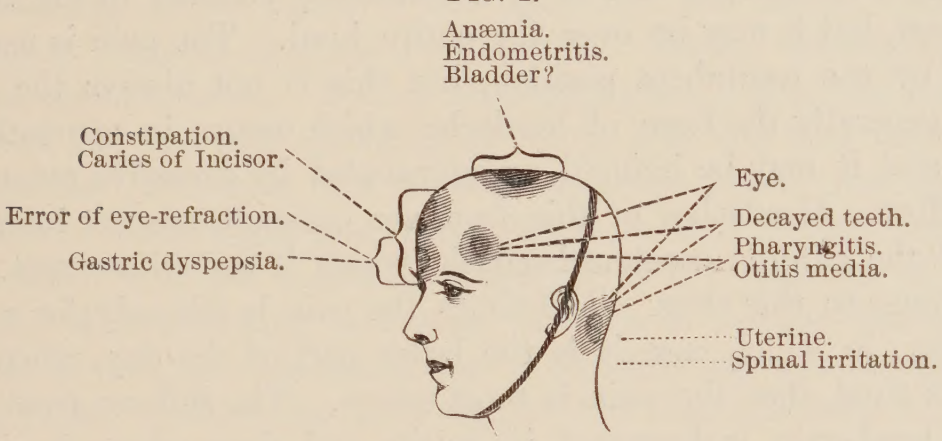
[1] *Diseases of the Nervous System*, p. 529.

[2] *Op. cit.*, p. 1190.

there may be a sensory representation of the cortex in the cortex itself, but of this we cannot feel so confident as of a sensory representation of the membranes in the cortex."

A good deal of stress has been laid on the location of the pain in headache as indicating disease in different organs. Vertex pain was formerly considered to point to uterine disease; now the occipital region is considered the seat of pain due to womb disorders. The accompanying diagram from Lauder Brunton indicates the region to which pain due to disease of remote organs is generally referred:

FIG. 1.




Chronic Headaches of Functional Origin (*Medical News*, March 16, 1889).

It will be convenient, in considering the subject of headaches and their treatment, to divide them into certain varieties. This course has been pursued by all writers on the subject, but I do not think the extensive subdivisions which have been made are desirable, and I will adopt a simpler classification.

Headaches may depend upon causes within the brain and upon those external to it.

(*a*) *Headaches from Diseases exterior to the Brain:*

1. Rheumatic headache.
2. Headache from diseases of the skull and periosteum.
3. Neuralgic headaches.

(*b*) *Headaches due to Causes within the Cranium:*

1. Anæmic headache.
2. Hyperæmic headache.
3. Hemicrania or migraine.
4. Neurasthenic headache.
5. Dyspeptic or bilious headache.
6. Toxic headaches, from lithæmia, uræmia, diabetes, poisons absorbed into the system, etc.
7. Organic headaches, from tumor, meningitis, etc.

8. Sympathetic or reflex headaches, from eye-strain, uterine or ovarian disease, etc.
9. Constant chronic headache.

(*c*) *Headaches of Children.*

### Anæmic Headache.

Anæmic headaches are met with most frequently in women, but they also occur in men. The typical form is seen in women who are neurasthenic and bloodless. The pain is usually of a dull gnawing character; it is constant, and is most commonly situated in the vertex or forehead, but it may be over the entire head. The pain is usually relieved by the recumbent position, but this is not always the case. This is generally the form of headache which occurs in neurasthenic persons, and it may be induced or aggravated by excessive mental or bodily effort. Headaches of this form are constant, are not intermittent, and the chronic constant headache which is sometimes met with often belongs to this class. Sometimes the pain is felt only for a part of the day, in which case it is the latter part of the day, when the patient is tired, that the pain is most severe. The sufferer from this form of head-pain is depressed in spirits and despondent, is timid, and has a dread of things which it is improbable will occur. She suffers from tinnitus aurium, has attacks of dizziness, and often has flashings of light before the eyes. Sleeplessness is a common symptom, but the patient is often drowsy during the day. The digestive functions are disturbed, the tongue is heavily coated, the breath offensive, and there are the usual symptoms of gastric disorder.

Fothergill, describing these headaches,[1] says: "The pain varies in character from a dull weight to acute agony. It may be confined to the temples, the forehead, or the occiput, or it may be general. It may be accompanied by 'swimming' in the head or 'intolerance' of light or of sound. At times the slightest sound is simply unbearable. In other cases comparative ease can only be secured by lying in a dark room, like the Rev. Mr. Irwine's sister Anne in *Adam Bede:*

"'Miss Kate was sponging the aching head with fresh vinegar when he went into the room, so darkened by blinds and curtains that Miss Kate could not knit at the best.

"'It was a small face, that of the poor sufferer; perhaps it had once been pretty, but now it was worn and sallow. Miss Kate came toward her brother and whispered, "Don't speak to her, she can't be spoken to to-day." Anne's eyes were closed and her brow contracted as if from intense pain.'

"Miss Anne Irwine's headaches were those of indigestion evidently,

[1] *Indigestion and Biliousness*, p. 38.

and very bad headaches they were. They belonged to that variety which comes on the day after the meal which has provoked them, where there are some noxious products of late digestion poisoning the half-starved brain. In many cases the headache is distinctly that of anæmia, the blood being drawn to the abdominal visera by the digestive act. There is often a sensation of swimming in the head felt along with the pain, or dizziness. The pain in the vertex often experienced is symptomatic of cerebral anæmia."

The bowels are constipated and the colon is frequently loaded. The pupils are often dilated, but they may be normal in size, and the ophthalmoscope shows pallor of the optic disk and retina. The heart's action is frequent and the pulse feeble. Hæmic murmurs are often heard over the heart. During an exacerbation of pain the face may be flushed and hot with throbbing of the vessels, and this may give rise to the false impression that there is congestion of the head rather than anæmia. Tenderness over the vertebræ is often present, and there is associated with the headache neuralgia in the branches of the fifth nerve. The following is a good example of anæmic headache:

K. H——, aged sixteen years. Catamenia began at the age of fourteen years. Patient has been regular, but there has been no excessive flow. Two months ago, shortly after returning to work in a milliner's, she became quite suddenly very anæmic. She lost her color, became weak, was short of breath on exertion, and suffered from palpitation of the heart. About the same time headaches began. The pain was always frontal, generally coming on in the afternoon. Lying down relieves the pain, but fast walking or going up stairs causes increase of the headache and throbbing all through the head from the forehead to the occiput. The menstruation is scant; the patient has nausea and poor appetite. Pulse 88, very small. Heart is feeble, but there is no murmur heard. The face is pallid and the conjunctivæ and mucous membranes of the lips seem to be without blood. Examination of the blood shows that the hæmoglobin is 30 per cent. and the blood-corpuscles 4,300,000.

These headaches may be the result of hæmorrhages, but they are more frequently due to slow deterioration in the quality of the blood or to some nervous causes which diminish the calibre of the blood-vessels and thus reduce the blood-supply to the brain.

Severe headache is often experienced by women when they first get up from childbed where they have flooded profusely. We must remember, however, that cases of extreme anæmia are frequently met with in which no headache is experienced at all, so that it seems necessary for the production of anæmic headaches that there shall be some disorder of the nervous elements as well as deficient supply of blood. A patient now under my care has been in a condition of extreme anæ-

mia varying in degree for several months. At one examination of the blood, made with great care by Dr. C. W. Burr, the hæmoglobin was 35 per cent. and the corpuscles but 2,240,000, which is about 45 per cent. of the normal number; and yet she has never had headache during her illness.

In this form of headache it is very common to see a craving for stimulants in the subjects of it, as a glass of wine or spirits often relieves the pain in the head temporarily. They are also liable to become addicted to opium and chloral, and I have seen several cases of morphine habit which began in the taking of small doses of morphine for the relief of anæmic headaches.

The prognosis is good if the system has not become reduced to too low a point, but recovery is often slow, and the headaches may persist for some time after the general condition of the patient has improved and is apparently normal.

**Treatment.**—The obvious course of treatment is first to improve the nutrition and build up the general health. We of course cannot hope to relieve the headaches until the causes of them have been removed; therefore, the first indication is to relieve all sources of the anæmia that can be reached, such as uterine hæmorrhages or bleeding hæmorrhoids and other discharges. Change of air and travel will often accomplish more than any therapeutic means that can be adopted. When we cannot send the patient away from home the rest treatment is exceedingly useful. The very best results can be obtained by building up the general health, enriching the blood, and improving the nutrition by the rest treatment.

Iron and arsenic are of more value than any other internal remedies which can be given. In selecting a form of iron we should use that which is most easily absorbed and least liable to constipate. Day is very partial to the ammonio-citrate of iron. The pill of the carbonate of iron—the so-called Blaud pill—is a very useful form when it is properly prepared. This is the pill which Niemeyer declared was the foundation of his success in practice, "my good fortune in the treatment of chlorosis—to which, by the way, I owe the rapid growth of my practice—having given me a great reputation as the possessor of a sovereign remedy against that disease." Niemeyer's formula is—

℞. Ferri sulph. pulv.,
Potass. carb. puræ, āā. ℥ss.
Tragacanth., q. s.—M.
Ft. pil. No. xcvj.
Sig. Three pills three times a day—four or five pills may be given three times a day.

Many of the Blaud's pills which are dispensed are of very little value, because they have undergone changes which make them quite different from the original preparation. The lactate of iron is a favorite form with Weir Mitchell, and the metallic iron—iron by hydrogen—is probably as reliable a form as can be used. Large doses of the subcarbonate of iron are well borne, and usually show speedy benefit in the quality of the blood.

In some patients of feeble digestion I have found dialyzed iron very useful, and the elixir of malate of iron and the albuminate of iron are excellent forms where the digestive organs are delicate.

Arsenic is of prime importance in conjunction with iron in these cases. It should be given in small doses at first, and is best administered in the form of Fowler's solution. In most of the cases that we meet with it is necessary to precede the administration of iron and arsenic by laxatives and cholagogues to prepare the digestive organs for the absorption of iron.

Digitalis is a useful remedy, as it strengthens the heart's action and thus regulates the blood-flow to the brain.

Strophanthus, either alone or combined with strychnine, I have found more advantageous than digitalis in many of these cases, as it is less liable to disturb the stomach.

Opium is recommended by Day and also by Anstie. The former says he has never seen any harm follow its use in small doses, even when it has been administered for a long time, provided that it has been given in combination with a stomachic.

Phosphorus is often very useful, but it is very trying to the digestion.

The hypophosphites or phosphoric acid may be given where phosphorus is indicated, and are better tolerated by the stomach.

Nitro-glycerin is a remedy which is indicated by its physiological action, and experience has shown it to be of considerable use. Gowers recommends it highly, and states that he is in the habit of giving it in small doses, $\frac{1}{200}$ to $\frac{1}{150}$ grain, three times a day.

Oxygen inhalations have been employed with advantage in these cases. There is always temporary relief following its use.

Hamilton and A. H. Smith have used nitrous-oxide gas by inhalation in the headache of anæmia, and state that it has been of great use in their hands. Birdsall, however, has made some experiments with nitrous-oxide gas, and found it without value in the cases of headache in which he used it.[1] It should be administered daily, and about 4 gallons of the gas, diluted one-half with atmospheric air, should be used per diem. In the administration of nitrous-oxide gas it should not be given up to the point of insensibility, but only until there is

[1] *New York Med. Journ.*, Mar. 7, 1891.

slight tingling of the lips and tongue felt. Both oxygen and the nitrous-oxide gas can be obtained now in cylinders which may be taken to the patient's house and used very conveniently.

Alcohol is of value in this form of headache, but should be used guardedly, and should be given only with the meals and in a diluted form. Malt extracts are preferable to the stronger spirits. For improving the general health, beef-juice and the beef-peptonoids are valuable in aiding to build up the tissues.

For the violent exacerbations of pain we may employ chloral, antipyrine, phenacetin, or exalgin. These latter remedies interfere generally too much with the circulation to be used to any extent, and we are obliged, therefore, sometimes to resort to opiates rather than use the aniline products. If opium must be used, codeine is the preferable form.

In some cases a cup of hot tea or coffee will relieve the more severe attacks, and the citrate of caffeine or guarana is often very useful. In some of the more severe attacks of anæmic headache ether by inhalation gives great relief. In one patient who suffered very severely from headaches of the anæmic and neurasthenic type ether inhaled in moderate amount enabled her to tide over some of the most violent attacks.

Occasionally nitrite of amyl by inhalation is of use, but the odor is too disagreeable to most persons to make it desirable.

When the pain is very intense it is justifiable to administer morphine hypodermically. Frequently very small doses—for example, $\frac{1}{12}$ grain—will be sufficient either to relieve the pain entirely or to make it bearable.

Local applications of hot-water bags or sponging with hot water will afford temporary relief. In some forms of anæmic headache lithæmia may be present. This will require special antilithic treatment, and nitro-muriatic acid just after meals, with one of the alkaline waters three hours later, is recommended. In some cases a strict milk diet is the only means which is sufficient to benefit the condition. When the anæmic headaches are associated with uterine disorders, Hamilton recommends the following prescription:

| | | |
|---|---|---|
| ℞. | Ammonii bromidi, | ʒj ; |
| | Tinct. cannabis indicæ, | fʒj ; |
| | Mucilaginis acaciæ, | fʒiv ; |
| | Spirit. menth. pip., | fʒij.—M. |

Sig. A tea-spoonful in water three times a day.

Cannabis indica may also be given in combination with iron, and should be continued for a length of time.

Where other means have failed a visit to some chalybeate spring has cured the anæmia and relieved the headache.

### Headache of Hyperæmia.

This form of headache is most common in plethoric, middle-aged persons. It is usually met with in men, and but rarely in children and in women. It is often associated with the gouty taint, and is seen in persons given to over-indulgence in food and drink. Want of sufficient exercise, and, in fact, any conditions which tend to plethora of the system, predispose to this variety of headache, which is associated with a general excess of blood throughout the body.

The hyperæmic headache may follow violent bodily exertion or immoderate laughing, coughing, etc. One frequently meets with cases of bronchitis in which one of the most distressing symptoms is a violent pain located at one point, usually in the vertex, which is induced by every paroxysm of coughing. Heart disease, more especially mitral insufficiency, causes cerebral hyperæmia and headache, and any pressure which interferes with the return of the blood through the jugular veins is liable to cause it.

The pain is throbbing and extends over the whole head. The arteries are hard and pulsating, the veins full and tortuous. The temporal arteries are hard and bounding, and frequently the pulsations may be seen. The pain is increased by lying down. There are usually a heavily-coated tongue, nausea, and disturbance of digestion. Associated with the headache are ringing in the ears and often hallucinations of vision and hearing. There is confusion of ideas, and the patient's mental operations are slow.

These headaches may be met with in women at the menopause, and sometimes at the catamenial periods. They are frequently associated with congestive dysmenorrhœa, and are one of the most trying symptoms of this condition.

**Treatment.**—A violent congestive headache is frequently relieved by spontaneous bleeding of the nose, and therefore any means which will speedily relieve the cerebral congestion are recommended. Cupping or leeching gives prompt relief, and cold affusions or the ice-cap to the head will greatly benefit the attack. The application of a leech at each side of the septum narium and about one-half an inch above the nares is a useful expedient. This, however, is rather a disagreeable and inconvenient mode of procedure, and is hardly to be recommended.

Dr. J. Leonard Corning has suggested an apparatus for artificially inducing epistaxis, which consists of a jar connected with an air-pump and an india-rubber tube connected with a small bottle which is provided with a scale. A bifurcated tube connects the bottle with two

small cupping-bowls, which are sufficiently minute to admit of their introduction into each nostril. As they are provided with india-rubber garnitures, it is possible to adapt them accurately to the size of the septum. The apparatus is used by applying the cupping-bowls; a small scalpel is inserted just beneath the edge of each, and the mucous membrane of the septum slightly scarified. The cupping-bowls are then connected with the vacuum-jar and the air-pump applied.

Dr. William C. Glasgow[1] has also suggested the abstraction of blood from the nose in the treatment of congestive headaches by pricking the cavernous bodies. He says: "If we examine the nasal chamber during the attack of congestive headache, we shall find the cavernous bodies in a state of tension. They may not be greatly swollen or enlarged, but to the eye the condition of the mucous membrane is that of tension and fulness. The degree of tension corresponds in a measure with the severity of the headache. A few years ago I treated these cases with hot alkaline sprays gently applied and the use of hot fomentations combined with the usual constitutional remedies. This mode of treatment has not been altogether satisfactory, and during the past four years I have substituted for it the local abstraction of blood, for which I can allege unqualified success. To produce bleeding no cut is required. The cavernous body is simply pinched, and the blood flows freely until the tension has been reduced, and then it ceases. The amount of blood drawn rarely exceeds one ounce. In many cases a single drachm of blood removed will give the required relief. In cases of extreme congestion the flow will equal several ounces before it ceases."

The ice-water cap is a very pleasant and cleanly method of treatment. It consists of a coil of india-rubber tubing or lead pipe applied to the head, through which a stream of ice-water is allowed to flow.

Pressure applied to the carotid arteries will often relieve the intensity of a congestive headache by diminishing the flow of blood to the brain.

Dr. Corning has suggested a form of electric compression by means of which he compresses the carotids and passes a galvanic current at the same time. It is an ingenious contrivance, but, unfortunately, is not often at hand when the patient is most in need of relief.

The hot bath, either the hot-air or Turkish bath, is useful, provided sufficient care is exercised in its application. The patient should not remain in the hot room too long, not more than fifteen or twenty minutes, and as soon as he has left the bath he should be put to bed and wrapped in blankets.

Of simple means, which are at the disposal of almost any one,

[1] *New York Medical Journal*, Sept. 3, 1887.

probably the best thing for a congestive headache is to put the feet in a hot mustard bath and then use freely cold applications to the head.

Ergot and bromide of potassium are remedies markedly indicated in this form of headache. Hydrastinin may be given hypodermically, and will be found useful. Antipyrine and acetanilid may be given in 5-grain doses every half hour until 15 or 20 grains have been taken, and they are remedies of great value. They act more promptly than the bromides.

I have found, however, very great advantage from the use of bromide of lithium given in doses of 10 grains every half hour until 30 or 40 grains have been taken; this, combined with a counter-irritant in the form of a mustard plaster to the back of the neck or solution of menthol in alcohol to the forehead and behind the ears, is a reliable plan of treatment.

It should be borne in mind that it is essential to use those remedies which are least likely to disturb the stomach, as this organ is always irritable during the attack. An effervescent combination of salicylic acid and antipyrine or effervescent salicylate of sodium alone is sometimes of value. I have seen speedy and gratifying results from the use of guarana and salicylate of sodium. Guarana is of value on account of the caffeine which it contains, and, according to Gowers, it represents twice as much of this alkaloid as tea and five times as much as coffee.

Compression to the head during a severe congestive headache is often useful. This may be accomplished by encircling the head in a rubber bandage or rubber tubing, like an Esmarch bandage. Hamilton recommends making pressure by applying compressed sponges to the temples, holding them in position with a tightly-applied bandage, and then causing them to swell by wetting them.

Between the attacks of headache it is well to administer calomel and taraxacum at night, followed by a saline in the morning. Bartholow recommends the administration of arsenic for a length of time, while Hamilton and Day believe in the efficacy of small doses of belladonna.

Electricity in the form of galvanism has been found useful in certain cases, and Hamilton speaks favorably of its use both during the attack and as a preventive. He advises the following method of application: "The cathode is to be placed on the superior cervical ganglion of the sympathetic and the anode on the forehead. Very mild currents from two or three cells are sufficient, and under all circumstances the operation should be conducted with great care. The application should last but a minute or two. It may also be made by means of large sponge- or cotton-covered electrodes, one being placed on the top of the head and the other at the back of the neck. Suboccipital headaches are decidedly relieved in this way."

There is a well-known variety of congestive headache which results from excessive indulgence in wine or spirits on the previous night. It is characterized by a sense of intense pressure or weight on the head, nausea, and eructations of gas. It is often relieved by minute doses of arsenic frequently repeated, or by 10-grain doses of Seidlitz powder given every fifteen minutes. Tincture of nux vomica in 1-drop doses administered every fifteen minutes has also proved useful.

Another form of congestive headache is that which is caused by exposure to the sun. Persons who have suffered from sunstroke or who have been overcome by the heat of the sun are especially liable to this variety of headache. I had under my care some years ago a lady who had had an attack of partial sunstroke several years before, who could not go out while the sun was shining without suffering intense headache. In another patient, who had once been overcome by the heat of the sun, a very moderate degree of exposure to the sun would always cause violent congestive headache.

In these cases the headache is dull and throbbing. They are best relieved by cold douches and the application of the ice-cap. Internally the following prescription is useful:

℞. Spirit. ammonii aromat., f℥ss;
Sodii bromidi, ʒvj;
Inf. gentian. comp., ℥iij.—M.
Sig. A tea-spoonful in ice-water every half hour until relieved.

In congestive headaches from excessive brain-work there are generally insomnia, depression of spirits, irritability of temper, and a sensation of difficulty in mental operations. The heart's action is often weak; the carotids throb visibly. The patient experiences dizziness, tinnitus aurium, and muscæ volitantes. The stomach is irritable, the breath foul, the tongue coated, and acid eructations are common. Rest from work should be enjoined, and the following prescription may be given:

℞. Carbonis lig., ℥ss;
Sodii bromidi, ʒvj;
Pulv. acaciæ, gr. xx;
Inf. gentian. comp., q. s. ad f℥vj.—M.
Sig. A dessert-spoonful three times a day.

After the pain and extreme symptoms have subsided it is well to substitute for the charcoal-and-bromide mixture the following:

℞. Strychninæ, gr. ss;
Acid. phosphorici dil., ℥ss;
Elixir. calisayæ, f℥vss.—M.
Sig. A dessert-spoonful three times a day.

Or, should the heart's action be feeble and the capillaries dilated, give 5 drops each of tincture of nux vomica and tincture of strophanthus.

Ergot is sometimes useful in small doses, but it is so liable to disturb the stomach that it can seldom be given with advantage. Day is partial to the use of a combination of ergot and spirit of chloroform.

School-children often suffer from headaches of a congestive type. The face is flushed and the eyes suffused. There is throbbing pain through the head, which is worse after eating. The patient often has night-terrors and bad dreams, and there is frequent grinding of the teeth at night. These congestive headaches in children are often caused by enlarged tonsils, which interfere with the return of venous blood from the brain. I have on several occasions seen troublesome headaches in children cured by reduction in the size of the tonsils. When the headaches are caused by over-study and confinement, removal from school is necessary, and small doses of the bromides, together with plenty of fresh air, exercise, and mild calisthenics, will generally afford relief in a short time.

During the intervals of the attacks measures should be used to reduce the blood-pressure and the general plethora of the patient. A proper diet should be very strictly followed, and nitrogenous food, especially meats, should be eaten only in moderation. Wine and spirits should be avoided almost entirely, and but little sugar should be taken. Purgatives are of great value, and salines are particularly indicated. Occasionally a pill of blue mass or podophyllin should be given at night.

The treatment which is given at Carlsbad and Marienbad is applicable to this form of headache. The regulated exercise, moderate diet, and free use of salines are the means which afford so much relief at these places.

Massage, Swedish movements, and abundant open-air exercise are important for patients in the intervals between the paroxysms.

## Toxæmic Headache.

Toxæmic headaches are the result of some acute or chronic condition of the blood. The headache which results from a debauch is a familiar example of a toxæmic headache, as is also the headache from the excessive use of tobacco. The headache following the inhalation of ether or the taking of drugs like chloral, opium, etc. is another illustration of toxæmic headache.

Uræmia is another condition of the blood which causes headache, accumulation of urea in the blood poisoning the nerve-centres. The dull headache associated with albuminuria is familiar to all. Chronic alcoholism, lead-poisoning, and diabetes are accompanied by headaches. The inhalation of poisonous gases, or even an excess of carbonic acid in

a room, are well-known causes of headaches, and every medical student has experienced headaches from breathing the exhalations from bodies in the dissecting-room.

Persons who suffer from lithæmia are subject to headaches from trifling indiscretions in eating or drinking. The most severe cases are seen in those who lead a sedentary life and indulge too much in eating and drinking. The urine is usually of high specific gravity and deposits a brickdust sediment; the bowels are constipated, sleep is disturbed, and the digestion bad. Sometimes there are gouty manifestations in the joints.

Haig has written at length on the relations of headache to the excretion of uric acid. He says the connection between this kind of headache and the excretion of uric acid seems definitely established: "There appears to be retention of uric acid before the headache, excessive excretion during the headache, and diminished excretion after the headache."

Haig says[1] that he himself was a sufferer from migraine, or uric-acid headache, as he calls it, and that it was in trying to find out something about the causation and treatment of his trouble that he began his researches into the influence of uric acid in diseases of the nervous system. He found on experimenting that by influencing the excretion of uric acid he could influence the headache also; "that acids which diminished the excretion of uric acid in the urine relieved or removed the headache, while, on the other hand, alkalies increased the excretion of uric acid and made the headache worse. I also found that by retaining or storing up uric acid for a day or two by means of acids I could accumulate it in the body, and by then giving an alkali I could bring out a lot of it into the blood and urine, and could produce headache at will; and proved at the same time that the headache is proportional to the excess of uric acid over urea, and not to the amount of alkali used to bring it out."

This writer states that he has been living on a diet in which milk, with occasionally small quantities of fish or egg, constitutes the only animal food, for seven or eight years, and almost never has a headache. If he eats meat and drinks wine for two or three days in any week, he suffers with a bad headache. He therefore recommends in these cases the use of a non-nitrogenous diet and nitro-muriatic acid. He also finds that a course of salicylate of sodium is useful in clearing out stores of accumulated uric acid.

During the paroxysm of uric-acid headache Haig recommends local applications of mustard, and internally aromatic spirit of ammonia or nux vomica, in place of giving the acid, which he thinks is not

[1] "Uric Acid in Diseases of the Nervous System," by A. Haig, M. D., Oxon., F. R. C. P., *Brain*, spring No., 1891, p. 63.

absorbed by the stomach during the paroxysm. Sometimes he finds that opium or mercury in small doses will succeed in relieving the pain. He very positively forbids the use of salicylate of sodium while the headache is bad, as it will increase the gastric trouble and cause or increase nausea. "The best rule," he says, "is to give acids first and get the stomach into good humor, and then give salicylates."

Uræmic headaches are well known to the general practitioner. There is nothing distinctive about these headaches as regards the location of the pain, but the association of dulness or stupor with them and the symptoms of kidney disease will usually enable one to make the diagnosis. Accompanying the headache are vomiting, tendency to heavy sleep, and more or less œdema. Under these conditions a prompt examination of the urine should be made, and it will probably be found that it is scant in amount, although occasionally the amount of urine may be copious and albumin present in only small quantity.

The best treatment of these headaches is the use of the hot-air bath and the administration of digitalis and purgatives. The hypodermic injection of muriate of pilocarpine is the most prompt way to bring about action of the skin. I may here remark that it is a good rule in all cases of headache to examine the urine as a matter of routine.

The headache associated with diabetes is not of frequent occurrence, and when it is met with is of serious significance, as it generally precedes some grave symptoms belonging to the latter stages of the disease.

Another form of headache which we are justified in considering toxæmic is that due to malaria. This variety is different from all other headaches in the recurrence of the attacks at regular intervals. The pain, as a rule, is frontal, and it may be distinctly neuralgic in character and confined to the distribution of the fifth nerve. The term brow-ague, which is frequently used, describes this variety of headache.

Dr. James J. Putnam[1] denies that the so-called brow-ague, or intermittent headache, is malarious in origin, and states that Dr. Mitchell also takes the same position.

This may be true of some intermittent headaches, but I have so frequently seen them in persons living in malarious places, and in connection with intermittent fever, that I cannot doubt the malarial character of many cases of intermittent headache. I think, too, that they are different from the neuralgias of the fifth nerve, which may be intermittent and even recurring at the same hour on successive days.

The treatment is very clear, quinine in sufficient doses being the important remedy. Frequently, however, these attacks do not yield until arsenic is given in greater or less doses. Sometimes, where

[1] *Boston Medical and Surgical Journal*, Aug. 13, 1891.

quinine has failed in large doses, Warburg's tincture or the inspissated extract in pill form should be given. The dose of quinine necessary to check the paroxysms of headache is often greater than that necessary to break up the chills.

Salicylate of cinchonidine is particularly applicable to the treatment of intermittent headache. It may be given in a capsule or in a freshly-prepared pill. A compressed pill of this sort should never be given.

Most patients suffering from prolonged malaria are anæmic, and iron should be given, combined with small doses of arsenic, for some time.

The headaches from chronic lead-poisoning are dull in character. They should be treated as are other forms of lead-poisoning.

It is not an uncommon thing to meet with headaches from the prolonged administration of arsenic; for example, in the treatment of chorea by large doses of Fowler's solution the patients often have considerable head-pain, which is relieved by reducing the dose of arsenic.

The treatment of headaches the result of inhalation of poisonous gases should consist in the administration of remedies which will rapidly eliminate them. Day refers to the case of an old body-snatcher who frequently had severe attacks of headache from the inhalation of the gases from the bodies he was handling. He found by experience that alcohol in any form increased the pain and nervous depression from the gas-poisoning, but the prompt use of an active purgative would rapidly cure the headache and depression.

A form of headache which is very frequent in women is due to the excessive use of tea. Associated with this are irregularity of the heart's action and a sense of oppression and discomfort about the cardiac region, with irregular or intermittent pulse. There are also gastric disturbance, loss of appetite, and flatulence, with great nervous depression. These headaches are usually relieved by abstinence from tea, careful diet, and the administration of quinine, iron, and strychnine.

### Dyspeptic or Bilious Headache.

This variety hardly requires separate consideration, as it has been considered to a great extent under Congestive Headaches. These headaches are the results of over-indulgence in eating or drinking, but may be associated with indigestion and hepatic engorgement, due to insufficient exercise or diseases of the liver. The pain is dull, is not acute, and is usually frontal in its location. It is frequently associated with disturbances of vision, such as scotomata and flashings of light. There is dizziness, and frequently there are nausea, vomiting, and other symptoms of gastric catarrh.

During the paroxysm small doses of arsenic may be given, frequently

repeated. From ½ to 1-drop doses of Fowler's solution every half hour will sometimes relieve the nausea and headache. Citrate of caffeine and saline laxatives are also useful. Very often unloading the stomach by an emetic will afford prompt relief, and small doses of bromide of sodium are then sufficient to relieve the head-pain.

### Neurasthenic Headache.

Persons suffering from neurasthenia as a rule have various forms of uneasiness in the head, varying from intense pain to a constant dull aching, or perhaps merely a sense of discomfort and pressure. Some of these headaches have already been described under the anæmic form, but there are others which are not associated with anæmia, but appear to be due to the depraved condition of the nervous system.

In hysteria we meet with the form which is very characteristic, known as clavus hystericus. It consists in an intense localized pain, and has been compared to that which would be caused by a nail driven into the head; hence the name. It is generally described as being in the vertex.

For the treatment of these headaches we must direct our attention to the general state of the patient, as it is impossible to give more than temporary relief until the condition of nerve-exhaustion has been benefited. Of all the means which have been tried, there have been none so successful as the rest treatment recommended by Dr. Weir Mitchell.

There are many patients who are unable, either on account of the expense or the time required, to take a thorough course of the rest treatment, and who yet very much need the building up and renewal of the tissues which this treatment can accomplish. In these cases Dr. Mitchell recommends what he calls "partial rest-treatment." This consists essentially in giving the patient a large amount of digestible food, with more rest than is ordinarily taken, and employing massage. The patient is instructed to take a small cup of cocoa on waking in the morning, after which rest for twenty minutes is enjoined. Then a sponge-bath while lying on a blanket, followed by brisk friction of the skin. After this, dress and rest for twenty minutes before breakfast. After breakfast an hour's rest. Massage should be given, if possible, about ten o'clock in the morning, and an hour's rest is to be taken after this treatment. After each meal an hour's rest is enforced also. Electricity is sometimes employed, but not as invariably; and if it is given, the best time for it is just before the evening meal. Four or five glasses of milk should be taken during the course of the day, and from one to three ounces of the fluid extract of malt should be taken with each meal. If the stomach will bear it, cod-liver oil is a useful adjuvant in the treatment of these cases.

At times these patients have severe paroxysms of pain, and it will

then be necessary to use special means for their relief. Occasionally, massage to the head will be comforting, and the galvanic or faradic current may be used with advantage. It is desirable in these cases to avoid as far as possible the administration of drugs during the attack, as the patients speedily acquire the habit of using almost any medicinal agent which is given for the relief of pain. When, however, there is evidently acute suffering, we are compelled to use some means to check the pain, and then we will find of importance antipyrine in 5-grain doses, repeated every half hour until 20 grains have been given. Often it is well to guard the patient against the depressing effects of antipyrine by giving a grain of quinine with each dose.

A diffusible stimulant, like a glass of sherry or champagne, will often quickly relieve the intensity of the pain, but, as before remarked, alcohol is objectionable in these cases, as the habit of using it is readily formed. Guarana, caffeine, and small doses of cannabis indica may also be used, and phosphoric acid in small doses will often afford relief. Hamilton gives a very good formula to be employed continuously, which consists of a pill of the arseniate of strychnine, strophanthus, and quinine.

### Sympathetic or Reflex Headaches.

Formerly, headaches of this kind were considered as belonging to neurasthenic patients alone, but of late years the relations of headache to eye-strain have been so carefully studied that our knowledge on this subject has been much increased. It is now a well-established fact that severe and constant head-pain may be caused by slight errors of refraction and by nasal and ear diseases, and it has been recognized for many years that headaches may be the result of uterine disease.

The pain from eye-strain is usually felt over the brow. It does not spread to the vertex, but is generally confined to the forehead or immediately over the brow, and is sometimes felt in or behind the eyeball itself. Sometimes it is referred to the occiput. Examination of the eyes in these cases reveals some form of refraction error or muscular insufficiency.

Julian J. Chisholm[1] considers that astigmatism is a very common and often unrecognized cause of headache, and that the class of persons in which it occurs are healthy people, young, active, and industrious. They all suffer more or less with eye-pains and headache, which they call neuralgia—a term which they have learned from their family doctor.

Stevens has written quite fully on the relief of various disorders of the nervous system, as well as headaches, by tenotomy of the ocular muscles. He describes several cases in which headache has been

[1] *International Clinics*, April, 1891.

entirely relieved by the use of tenotomy and correcting the refractive errors by glasses. He believes that very frequently tenotomy is the essential part of the treatment.

It is hardly worth while at this day to refer to the literature on this subject, as it is now very extensive, but within the last year there has been a large amount of additional testimony to prove the importance of thorough examination of the eyes in all cases of headache.

Hypermetropic persons most frequently suffer from pain, aggravated by the use of the eyes and bright lights, and astigmatism is usually associated with this condition. Myopic persons may also have dull pain in the head from excessive use of the eyes, and along with the pain there are vertigo and other uncomfortable head symptoms. Frequently there are evidences of inflammation about the lids and conjunctivæ. Correction of the ocular defects does not always immediately cure the pain in the head: it is frequently necessary to pursue a course of constitutional treatment.

Dr. W. F. Mittendorf has recorded the results of the study of 1000 cases of ocular headache.[1] He says that an unusually large number of school-children and college-students, as well as women who have had but little out-door exercise and whose muscular system was undeveloped, were among his patients. He lays much stress upon out-door exercise and gymnastics, as well as glasses, in the treatment of these cases. A number of his patients, he says, would be perfectly free from headache and able to lay aside their glasses could they devote much time to gymnastic and out-door exercise, but if obliged to keep close in school they would have to continue the use of their glasses.

He also refers to the well-known fact that many people go through life with hypermetropia and astigmatism without inconvenience, but if their health becomes impaired from some cause or other, or if they abuse their eyes, asthenopic troubles come on at once.

The errors of refraction of the 1000 cases were as follows:

| | |
|---|---|
| Myopia, | 2 per cent., |
| Hypermetropia, | 11 " |
| Astigmatism, | 83 " |

of which 119 cases were myopic and nearly 700 were cases of hypermetropic astigmatism.

This writer says that among the most distressing symptoms in cases of ocular headaches are frontal, supraorbital, temporal, and occipital pain, which sometimes extends from the back of the head along the spinal column; disturbance of the stomach, producing at times nausea and even vomiting; pain, extending even to the limbs; twitching of

[1] *Medical Record*, July 18, 1891, p. 59.

the lids; distressing nictitation, and even choreic movements of the face; depression, bordering on melancholia; and other troubles usually classed as general nervousness.

He also refers to a "Sunday-morning headache," which he believes is the result of the unusually hard work of the preceding Saturday preparing for Sunday, so that the eyes as well as the rest of the body get thoroughly fatigued. He says that he has had a number of cases where a cylindrical glass has led to the cure or prevention of Sunday-morning headaches which had existed regularly for several years, and which had been ascribed to some obscure malarial influence.

He finds relief for an attack of headache due to eye-strain from a lotion composed of lavender, rosemary, camphor, and alcohol, applied to the closed lids and forehead.

Harrison Allen[1] has described headaches the result of nasal disease. He refers to a patient in whom merely touching the right middle turbinated bone instantly caused intense vertex pain. He relates a second case in which there were attacks of general headache and clavus, in which he found disease confined to the middle turbinated bone on the right side.

Guye of Amsterdam,[2] to whom we are indebted for the word "aprosexia," denoting an inability to fix the attention on any more or less abstract subject, considers that with this impairment of the attention, so often due to nasal stenosis, go feebleness of memory and a tendency to headache. He cites the case of a girl, aged fifteen years, who had complained of almost daily headache for two years. She had always been a mouth-breather, and would forget by morning the lessons which she had learned the evening before. The pharyngeal tonsil was removed and appropriate treatment was directed to the nasal stenosis. One week later she returned with bright looks, and stated that she had had no attacks of headache, and that she was now getting the highest marks in her studies instead of the lowest.

Roe[3] has also written fully on headaches dependent upon chronic diseases of the nasal passages.

Stomach and liver disorders will produce a plethoric condition of the system and cause distension of the cavernous sinuses of the nose, thus producing intranasal pressure and sympathetic headache. In these conditions the pricking of the cavernous bodies, as described in the treatment of Congestive Headache, is to be recommended as a temporary expedient in these cases, but both Allen and Roe declare that the permanent cure of these nasal headaches can only be accomplished by relieving the intranasal pressure by the removal of hypertrophied tissue, or other means for the relief of the nasal disease.

[1] *The Medical News*, Jan. 30, 1886, p. 136. [2] *The Practitioner*, Sept., 1891.
[3] *Medical Record*, Jan. 25, 1888.

Lauder Brunton refers to cases of headache the result of decayed teeth, and declares that "the most common causes of headache, indeed, are decayed teeth and irregularities of vision."

In speaking of headaches from carious teeth I do not refer to the neuralgic pains which are familiarly known in connection with aching teeth, but to the headaches which involve the entire head and sometimes assume the character of migraine, and which depend upon decayed teeth, and are relieved by the proper treatment of the teeth.

Dr. Brubaker has reported some cases of epilepsy which were dependent upon decayed teeth, and were cured by the removal or treatment of the offending teeth.

Sometimes the irritation connected with the cutting of the wisdom teeth gives rise to headaches of a diffusive and constant character, which only cease when the teeth are entirely through. Headaches from ear disease, obstruction by means of wax or foreign bodies, are well known to specialists in ear diseases.

In the case of headaches dependent upon diseased ovaries the pain is generally of a dull character, frontal in its location, and usually constant, but may be intermittent. It is seldom very intense, but is persistent and annoying.

Treatment directed to the inflamed or diseased organ will often relieve the pain in the head. However, I have met with a number of instances in which the head-pain persisted after the removal of the diseased ovaries by laparotomy. A very useful prescription for the headache dependent upon ovarian disease is the following:

℞. Ammonii bromidi, ʒvj;
Ext. hydrastis fl., f ʒss;
Tinct. gentian. comp., f ʒiss;
Aquæ, f ʒiv.—M.
Sig. A dessert-spoonful three times a day.

Blisters over the ovaries will sometimes give relief, and massage carefully and thoroughly applied to the ovarian region, together with the "wet pack," is often capable of alleviating the irritation of the organs and the pain in the head. Pressure on top of the head frequently allays the pain in this variety of headache, and Dercum[1] says that when one meets with a headache located in the vertex, and which has the peculiarity of being relieved by pressure, the attention should always be directed to the uterus and ovaries.

J. A. Wessinger[2] considers that headache due to derangements peculiar to young women and girls at puberty can best be relieved by

[1] "Headache, its Varieties," *University Medical Magazine*, 1891.
[2] *New York Medical Journal*, Aug. 8, 1891.

careful supervision of study and exercise, and by the internal administration of iron in the form of either the modified Blaud pill or the tonic chalybeate tablet of Flint.

### Organic Headache.

Tumor of the brain is almost invariably accompanied with pain, either local or diffused. The location of the pain, however, does not always correspond to the seat of the growth. I have more than once seen pain referred to an entirely different region of the head from the seat of the disease. As a rule, however, the pain is referred to the location of the tumor.

When using the term "organic headaches" I refer to all headaches in which there is a structural lesion present, including headaches from meningitis. In acute meningitis the pain is of course one of the most prominent symptoms, but we have a chronic variety of meningitis which gives rise to a dull aching pain that persists for a long time and is accompanied with various subjective symptoms, such as intolerance of light, noises in the ears, dulness of hearing, or there may be unusual acuteness of hearing. I believe there is more often present than is generally recognized a subacute or chronic meningitis of low grade, giving rise to a constant headache which may last for years.

Besides these forms of organic headache, there may be headaches the result of syphilitic gummatous growths under the scalp. Some of the characteristic symptoms of headaches due to syphilis are the greatly increased pain at night and disorders of certain ocular muscles, such as ptosis and paralysis of the sixth nerve, impairment of smell-sense, together with vomiting, disturbance of speech, and a dulness of intellect. The nocturnal exacerbations are seldom absent in this variety.

The treatment of headaches due to syphilitic disease consists in the administration of iodide of potassium and mercury, either combined or given separately. It is important to bear in mind the necessity of giving the iodide of potassium in large doses. The most convenient, and now the most general, way of administering the iodide is in a saturated solution, of which 1 minim represents 1 grain of the salt. The dose can be rapidly increased by beginning, say, with 10 grains three times a day, and adding 1 grain to each dose. It is sometimes found that a patient will tolerate from 100 to 140 grains three times a day, and frequently the symptoms are not markedly relieved until the largest doses are being taken. As soon as iodism is caused we should reduce the dose, and cautiously increase it again; but my experience has been that once iodism has been produced it is generally impossible to reach the same dose again without giving rise to the constitu-

tional symptoms of the drug, such as coryza, acne, and offensive breath.

The iodide is sometimes conveniently given in milk, as the taste is less disagreeable, and it is then also better borne by the stomach. It has also been given in effervescent alkaline water, such as Vichy, and is less unpalatable in this way than in plain water.

In some cases it is necessary to use mercury in full doses before relief is obtained. Mercurial inunctions give the best results, using either the unguentum hydrargyri or oleate of mercury, 10 per cent. strength. A good way to use the oleate of mercury is to dilute the 20 per cent. solution with lanolin.

The intolerable pain in some cases can only be allayed by full doses of morphine, but it is well to try, before resorting to this, local means, such as the ice-bag alternated with the hot-water bag.

In the treatment of the headache of meningitis, belladonna and ergot are the most useful drugs. The latter should be given in doses of from $\frac{1}{2}$ to 1 drachm three times a day. The stomach, however, is often unable to bear these large doses. Small doses of the bichloride of mercury, continued for a length of time, are valuable. Doses of $\frac{1}{100}$ grain of this drug, repeated every two hours, have been strongly recommended by a writer whose name I do not recall.

Counter-irritation is of much value in the headache due to chronic meningitis, and the actual cautery is the best means of employing this. The button of the Paquelin cautery should be brought to a white heat and touched lightly to the nucha at two or three points. This may be repeated every four or five days. Cups may be applied to the back of the neck, and occasional bleeding, after the method recommended by Dr. Glasgow and referred to in the treatment of Congestive Headache, may be used.

Even when there is no suspicion of syphilis the headache from brain tumor is frequently relieved by large doses of iodide of potassium, and in some cases a combination of the iodide and bromide of potassium is of more benefit than either of these remedies used separately. It has been asserted that when given in combination iodism is less readily produced than when iodide of potassium is given alone.

The iodide of lithium, in doses of 10 grains, may be given when the potassium salt is not borne by the stomach.

We must remember that there are cases presenting most of the features of periodical headache which depend upon some organic cause, such as tumor or exostosis. In cases in which there is doubt the examination of the eyes will reveal the presence of optic neuritis or swollen disk if a tumor is present.

## Headache Dependent upon Disorders External to the Skull.

The most common of these headaches are the neuralgic headaches, and, properly speaking, they should be considered under the Neuralgias. There are, however, cases of neuralgia of the scalp, depending upon exposure to cold or draughts, which involve the entire scalp rather than the distribution of any one nerve.

These headaches are best treated by the application of heat—as, for instance, the hot-water bag—and the administration of salicylate of sodium or phenacetin combined with salol.

Rheumatic headaches which affect the scalp or fibrous aponeurosis and the occipito-frontalis and temporal muscles are met with occasionally in patients who have a rheumatic diathesis. They are frequently the result of exposure to cold or sudden checking of perspiration, but may be independent of any exposure and associated purely with the accumulation of rheumatic poison in the system.

The pain is characterized by intense aching, and there is tenderness of the scalp, often extending into the jaws. The teeth also ache. The face is sometimes flushed. The pain increases in the evening and grows less toward morning. The urine is usually high-colored and loaded with urates, and the temperature may rise one or two degrees above normal in the evening.

The ordinary antirheumatic remedies are of value in these cases—the salicylate of sodium, or, what is better tolerated by the stomach, the salicylate of ammonium, given in effervescent Vichy. In chronic cases we should give colchicum in small doses, and it may be combined with the iodide of potassium. It has been rather the fashion of late to decry colchicum as pernicious, but I am satisfied that it is only because of the abuse of this remedy in times past that it has fallen into disrepute. It is certainly one of the best remedies we have for gout. A sudorific at bedtime is of great relief, and enveloping the head in a hot flannel or lying upon a hot-water bag will also afford ease in many cases.

If the case is persistent and the patient is able to leave home, he may go with advantage to some of the springs, such as Saratoga and Richfield. Some of the stronger lithia waters may be drunk at home with decided benefit.

Norstroem[1] thinks that some headaches are due to inflammatory thickening at the insertion of the muscles, generally the result of taking cold. He has obtained excellent results from massage of the indurated places.

One other form of headache from extra-cerebral conditions is that

[1] *Lancet*, Sept. 27, 1891.

dependent upon diseases of the periosteum. This is usually syphilitic, and has been considered among the organic headaches due to syphilis. The pain is very intense, and is worse at night; there is acute tenderness on pressure over the scalp, and frequently marked swelling is detected. Occasionally, there are gummatous growths in different parts of the head connected with the periosteum. These, on palpitation, frequently give a sense of fluctuation, and there is a strong temptation to open them with the idea of liberating pus and thus afford relief. If the pain in these cases does not yield promptly to the internal administration of iodide of potassium, the scalp may be shaved and mercurial ointment freely applied.

## Migraine.

This variety is considered by many authors in the class of neuralgic headaches, but it is so distinctive and important that I think it should be considered separately.

It does not by any means partake of the characteristics of the neuralgias, and the various sensory symptoms which accompany the attacks are as essential features as the pain. Indeed, as will be shown later, the attack may occur without headache.

The origin of the name is interesting. It is derived originally from the Greek *ἡμικρανίον*, expressing the fact of the pain being confined to one side of the head. From this arises the Latin *hemicrania*, then by Low Latin, *hemigrania*, from which comes the French *migraine*, or *megrim*, as it is frequently called in England.

It is distinctly paroxysmal, and is associated with other phenomena of a nervous kind besides the pain. The attacks occur at different intervals, usually once in three or four weeks, but they may return as often as once a week or even three or four times in a week, the frequency of the attacks depending usually upon the condition of the patient's system. I have recorded several cases in which the attacks recurred with regularity on a certain day of the week.[1] Liveing has also referred to this fact. Tissot[2] says that Salius relates the case of an Italian monk who for three years and seven months had an attack of violent hemicrania every Monday, the attacks lasting from twenty-eight to thirty hours. No doubt these paroxysms were the result of the unusual labors of the preceding day or of some change in the time and mode of taking food that day. Mittendorf, whose paper I have quoted later, speaks of having had patients whose attacks occurred with regularity on Sunday.

The cases which I reported were six in number. In some of them the attacks were apparently due to the occupation of the previous day; in others they came on Sundays, and were possibly due to the un-

[1] *The Medical News*, July 19, 1889. [2] *Traité des Nerfs*, vol. viii. p. 102, 1788.

usually late hour at which the patient rose on this day; but in one or two instances there was no reason, either from the work on that day or on the previous one, why the attack should occur on that particular day in the week except as a matter of periodicity.

A paroxysm of hemicrania is often preceded for a day or two by a sense of unusual depression, physical and mental. Sometimes for two or three days the patient awakens in the morning with a dull headache which passes off later in the day. Occasionally there are some disorders of digestion for a day or two, and it very frequently follows a period of severe mental or physical work, especially when there has been any irregularity or imprudence in regard to eating or drinking. Undue excitement, either of a pleasant or painful kind, is a cause, and long railroad journeys often precipitate a headache. Some patients experience unusual hunger the night before an attack, and even when no food is taken at bedtime they do not escape the headache next morning. The paroxysm is frequently ushered in by certain disturbances of vision or by evidences of general nervous disturbance, such as shivering, cold feet and hands, flushing of the face, and tremor.

The ocular symptoms are of special interest. The most common of these are the various forms of scotomata. Sometimes they take the form of a bright spot or many bright spots floating before the eyes, or zigzags of bright light. The scotomata may take forms which are regularly repeated, being sometimes like a bow with a double line, and at other times a circle with a dark and lighter line, and various other shapes.

Not unfrequently there is bilateral hemianopsia, which lasts for several minutes, perhaps longer, preceding the headache. The patient is able to see only objects on one or the other side, as the case may be. The hemianopsia is seldom complete; that is, the "blind side" is only blurred, and is not completely obscured.

Some very remarkable visual hallucinations preceding an attack of migraine have been described by deSchweinitz and others. Dercum relates the case of a patient, a married woman, who while alone in her room will see two of her children at her right side. So natural is the illusion that she turns to look at them. She has found, however, that the appearance of this spectre means that a headache is about to come on.

Mitchell reports a case of a woman who was subject to the hallucination of a large black and very hairy dog that appeared just before a severe paroxysm of migraine. The apparition usually, but not invariably, appeared as she was going up stairs. DeSchweinitz mentions a curious case in which the patient always saw a large green snake before the attack. In another animals, always either mice or dogs, were seen before the headache.

The pain may begin at any time of the day, but usually comes on in the morning. As a rule, it begins with pain over one eye, sometimes in a small spot, and this extends until the entire half of the head is involved. After the pain has become severe it is difficult for the patient to say whether the pain is confined to one side only or whether it involves the entire head. In some cases the pain begins in the occiput, and remains almost entirely in the posterior part of the head. With the pain there are coldness of the extremities, flushing of the face, and more or less nausea. In some cases, however, the face is pallid during the entire attack; and this fact has given rise to the division by some writers into two forms of migraine—the congestive type and the anæmic type, the angio-paretic and the angio-spastic.

The eyes are bright and suffused and light is painful to the patient. Occasionally there are hallucinations of hearing, and noises are intolerable. Day refers to the case of a lady who during the paroxysm could hear with such intense acuteness that the ticking of a clock in another room was distinctly audible, while at other times, when free from headache, she was unable to hear it.

During or preceding the attack there are other sensory disturbances felt in the limbs, tongue, and other parts. Usually the disorder of sensation is in the arm, but occasionally it is in the leg, and it may take the form of a complete hemianæsthesia. A sense of tingling or "pins and needles" is felt in the hand, fingers, and extending up the arm. It may be felt in the lips, cheek, or even the tongue.

The duration of these sensations is usually brief, lasting only fifteen or twenty minutes, but they may persist during the entire attack, and occasionally there is a sense of weakness associated with the paræsthesia. Transient aphasia is another symptom which is sometimes met with, and it occurs in those cases in which the sensory disturbances are right-sided. The aphasia lasts, as a rule, only for a few minutes. I have one patient who has frequent seizures of migraine which are quite often preceded by numbness, confined to the right arm and leg, together with temporary aphasia. These disturbances of speech and sensation, however, do not occur with every attack of migraine that she has, and sometimes she has one-sided numbness and disorder of speech, lasting a few minutes, but not followed by headache.

Gowers says: "The rule of right-sided association probably does not hold good of left-handed persons, and is not quite absolute in other cases. I have met with one case in a right-handed man in whom the attack began with left-sided hemianopsia, followed by tingling in the left foot, which passed up the leg and side to the mouth and tongue, and then the speech was deranged."

There are often slight mental disturbances during the attack; confusion of ideas is common, and there is temporary loss of memory.

There are also mild hallucinations. The patient may be harassed by a word or a sentence which he is continually repeating. Another mental condition during the attack, and sometimes preceding it, is that state which has been described as a sensation of double consciousness—a sensation as if everything the patient was saying or thinking had been said or thought before—and there is an indescribable effort to catch the thread of an idea which seems to be constantly fleeting from the memory. This condition has been ascribed to a want of harmonious action in the two hemispheres of the brain.

After these premonitory symptoms have lasted for a varying length of time, from a few hours to an entire day, the pain becomes agonizing and at times almost unendurable. There is nausea usually at the crisis of the attack, although in a lesser degree it may accompany the entire paroxysm, but when it occurs at the acme it results in vomiting. Sometimes a considerable amount of mucus and bile is vomited, but often there is only retching. After the vomiting the pain for a short time is greatly aggravated, but within a few moments the patient breaks into a perspiration, falls asleep, and awakens well. Sometimes, however, the vomiting is not followed by relief, especially if it occurs during the early part of the attack, and there may be frequent ineffectual attempts at vomiting without relief.

The general condition associated with the nausea is one of extreme prostration, wretchedness, and mental depression. In some cases the crisis is attended not by vomiting, but by an excessive amount of some secretion; for example, urine or perspiration. In some instances an excessive diuresis occurs at the crisis without any nausea or vomiting, and I have met with cases in which two or three profuse watery stools occurred at this time, and shortly afterward sleep ensued, followed by entire relief from the pain. The paroxysm lasts from a few hours to an entire day, ceasing when sleep comes. In severe attacks the pain may be continuous for two or three days.

In many persons the condition after a paroxysm is much better than before it. The patient feels stronger and brighter than he has for some time, and his mental faculties seem much more active than previously.

A very interesting fact which has been noticed by some writers is that there may be attacks of migraine without headache; that is, all of the sensory and other phenomena are present without the pain, or with so slight a pain as not to attract attention. These cases should always be borne in mind, as their symptoms may be misunderstood, and lead to the belief that there are some other conditions more grave than is really the case.

It is probable that a great many patients who are sufferers from hemicrania have attacks of sensory disturbances lasting a longer or a shorter time which are not followed by headache, yet are similar to the

phenomena which usually precede headache. These occur more frequently than we are aware of, because patients are often not observant of their symptoms. It is also likely that some of the curious seizures of temporary aphasia and temporary hemianæsthesia which one meets with are the sensory symptoms of migraine without the following pain.

The interval between the paroxysms is usually from two weeks to two months, though they may occur much more frequently, and sometimes not for three or four months. In women they come on about the catamenial periods, and sometimes continue after menstruation has ceased. In a patient of my own the attacks of headache occurred with regular periodicity at the time the monthly periods should have occurred for years after the cessation of the catamenia.

As before remarked, the general condition of the patient largely influences the attacks, so that the frequency of their occurrence depends to a great extent upon the patient's general health. Indiscretions in diet or over-fatigue, either physical or mental, may cause the paroxysms to occur much more frequently, and, on the other hand, an out-door life and freedom from care and worry may bring immunity for months at a time.

Many cases of migraine seem to depend upon the gouty diathesis, and any condition which produces lithæmia will precipitate an attack of migraine. Drinking certain of the heavier wines or eating too much rich and indigestible food will cause typical migraine, and with it characteristic evidences of lithæmia.

It is important to remember the association between migraine and epilepsy. This connection has been denied, but many of the phenomena preceding the attacks are so similar that we cannot but regard the two conditions as more or less allied to each other. Moreover, patients who suffer from migraine frequently have a family history of epilepsy, and both disorders may occur in the same person.

Gowers mentions several instances in which migraine had existed for many years and the patients afterward became epileptic. In some cases of epilepsy we have the attacks preceded by sensory and ocular symptoms, such as have been described above.

As to the prospects of recovery from migraine, everything depends upon the surroundings of the patient. If he can lead a perfectly wholesome life, free from care and anxiety, the disorder may be cured entirely. There are cases, however, in which, in spite of all favorable conditions and every form of treatment, the disease persists during the patient's entire life. As a rule, however, the affection is self-limited. It seldom lasts after the age of forty-five, and frequently becomes very much less severe even before this age. It is a disease of early life, usually beginning at or before the age of puberty and

extending into middle life. Children frequently suffer from it at an early age, and sex seems to exert no influence in the causation of the affection.

In women the paroxysms frequently cease after the menopause, but they often continue to have headaches, although different in character from those from which they formerly suffered. As a rule, in both men and women the attacks of migraine are replaced by neuralgia, usually in the supraorbital branch of the fifth nerve. Occasionally a constant occipital headache takes the place of the migrainous attack, and persists steadily for many years. Even when the paroxysms do not cease entirely, after the age of fifty there is some change in the character of the affection. The sensory symptoms, for instance, may cease or change their form, or the vomiting during the attack may cease. It may be taken for granted in the treatment of this affection that after the age of forty-five the paroxysms will be fewer, less severe, and more amenable to treatment.

In almost all cases careful study of the individual will reveal the necessity for improving the general health, or by regulating his habits as to work, diet, and exercise bring about a more satisfactory condition of the general health, which will in some measure influence the attacks.

Special attention should be given to the food, and the peculiarities of the individual carefully studied in selecting a diet for each case. In patients of a gouty tendency of course it is essential to restrict or entirely prohibit the use of wine, beer, and spirits. Excess of sweet and starchy articles of food should be equally avoided, and, in fact, such a diet as would be selected for a patient suffering from gout in any of its other forms should be chosen. In all cases easily-digested food is obviously important, and late suppers, pastry, and rich food of all kinds should be shunned.

In anæmic patients—and many sufferers from migraine are deficient in red blood—a diet of milk with raw-beef soup or peptonized beef-preparations, in addition to a full and wholesome dietary, should be given. In these cases the rest treatment, either fully or partially given, as recommended in the section on Neurasthenic Headaches, is of marked and often remarkable benefit. It has frequently occurred to me to see patients whose attacks of migraine had not yielded to medication, after a course of rest treatment improve greatly under the same remedies that had failed previously.

The therapeutics of migraine is naturally divided into medication for the paroxysm and the treatment during the intervals. The drugs which have been recommended are very numerous. The use of the bromides has been disappointing as a continuous treatment. Their value in epilepsy would lead us to infer that they might be of value in

migraine, but they are not efficacious in prolonging the intervals, and besides have the disadvantage of disordering the digestion and impairing the general health.

The most useful remedies during the intervals are tonics and nervines. In anæmic or chlorotic women iron and arsenic should be given for a length of time—say for three or four months—and cod-liver oil, if the stomach will tolerate it, is of prime importance. Even in patients who do not show evidences of anæmia iron is of value, combined with quinine and nux vomica or strychnine. The compound syrup of the hypophosphites—that is, the hypophosphites of lime, strychnine, iron, and quinine—is a useful preparation, should be given diluted in iced water, and may be continued for several weeks at a time. In some cases the stomach will bear a simple solution of the hypophosphites better than the syrup, and I prefer to give the hypophosphites in this way.

Of all the drugs which have been suggested in the treatment of this affection, by far the most useful is cannabis indica. It was first recommended to be given continuously for months by Dr. Greene in *The Practitioner* in 1872. He again wrote in the same journal in 1888 to endorse what he had stated as to the efficacy of this drug. He maintains that it is not simply palliative, but curative, and that in nearly all cases it will give permanent relief. Dr. Seguin[1] has given his experience in the use of this remedy, and recently has written strongly in favor of its systematic use. He advises that cannabis indica be given for a prolonged period. He prefers to administer it in the form of the extract, beginning with $\frac{1}{6}$ grain three times a day, and gradually increasing the dose. He believes that the good effect of this remedy is largely due to the influence which it exerts as a mydriatic.[2] He refers to the frequency with which headaches are produced by eye-strain, and the relief which is afforded by mydriatics and correction of the ocular defects; and he thinks that belladonna, cannabis indica, and hyoscyamine relieve headaches by the sedative influence which they exert upon the third nerve and the muscles which it supplies, including the iris. He remarks, by the way, that he believes that all cases of migraine are associated with refractive errors, and explains the immunity from headaches after the age of forty-five to fifty years by the fact that after this time the accomodative power is usually lost.

In the administration of cannabis indica it is of importance to bear in mind the difficulty of obtaining a reliable preparation, as there is hardly any drug more variable in its strength than this. Herring's

[1] *Medical Record*, N. Y., Dec. 8, 1877.

[2] "Lectures on Some Points in the Management and Treatment of Neuroses," *New York Med. Journ.*, May 17, 1890.

English extract and Squibbs's are reliable preparations, and there are also several others; but it is a good rule to see the druggist from whom you are about to prescribe the cannabis indica and ascertain whether he has a fresh extract. If one prefers to administer this remedy in liquid form, it is well to have a tincture made from a reliable extract. In giving cannabis indica for a length of time I prefer to give the tincture, as the dose can be more easily regulated than in pill form. The remedy may be given alone, and it is best to increase the dose gradually until the maximum of toleration is reached; that is, a dose a little less than that which produces a slightly dreamy, light-headed state. I would especially advise caution in the earlier doses of this remedy, as some patients are extremely susceptible to its influence, and the toxic effects produced by it are, in my experience, different from those described in the textbooks.

When given on an empty stomach the effects are very quickly produced, and I have found the results of an over-dose to be a sense of cardiac oppression, extreme palpitation, great anxiety, a sense of impending death, cold extremities, and clammy skin. These symptoms may last for two or three hours, the patient being obliged to remain in the recumbent position, and any attempt at raising the head causing an aggravation of all symptoms. After a few small doses of the drug the quantity taken may be gradually increased, and a large dose will be borne without any of the discomforts above described.

A useful way to give cannabis indica is in combination with arsenious acid and iron. The following is a good prescription:

℞. Ext. cannabis indicæ, gr. $\frac{1}{6}$;
Acid. arsenious, gr. $\frac{1}{60}$;
Ferri pulv., gr. 1.
Fiat pil. No. j.
Sig. Give one pill three times a day—the dose may be increased to two, or even three, pills three times a day.

Another good formula which may be kept up for a long time is—

℞. Ext. cannabis indicæ, gr. $\frac{1}{6}$;
Pulv. digitalis, gr. ss;
Ferri lactat., gr. ij.
Fiat pil. No. j.
Sig. Take one pill three times a day after meals.

Cannabis indica may be advantageously combined with nux vomica, and in some cases where there is a hyperæmic condition of the brain ergot may be added, as in the following formula:

℞. Ext. cannabis indicæ, gr. $\frac{1}{6}$;
Ext. nucis vom., gr. $\frac{1}{4}$;
Ergotini, gr. j.
Fiat pil. No. j.
Sig. Take one pill three times a day after meals.

This may be continued for some time.

In giving cannabis indica we must remember that its utility depends upon its continuous use for many months, and we should impress upon our patients the importance of taking the remedy without intermission for a long time.

The correction of ocular defects, no matter how slight, should be insisted upon, and we should bear in mind the success which Stevens[1] has obtained by tenotomy in cases of disorders of the ocular muscles. Nearly all oculists at the present day are fully impressed with the importance of correcting even the slightest errors of refraction in cases of headache, but all practitioners do not realize the importance of doing this; and I desire especially to endorse what Dr. Seguin has said in regard to examining the eyes of headache cases under the influence of a mydriatic.

After a thorough investigation into the condition of the patient's eyes, we should examine the other organs with care, especially the nose, and search for evidences of obstruction or other disease in the nasal passages. It is not always necessary to use surgical means in these cases, as we can very often afford great relief by the use of antiseptic sprays or washes applied to the air-passages.

In the treatment of migraine in lithæmic cases the use of nitro-muriatic acid, continued for a long time, is of considerable utility, but there are other cases in which the salts of lithia are of more value; and some of the lithia waters so commonly employed now-a-days are undoubtedly beneficial in the treatment of the gouty forms of headache.

In this, as well as in other varieties of headache, it is of great importance to keep the secretions free, and if there is any tendency to constipation mild laxatives should be employed, and the occasional use of podophyllin or a mercurial is of advantage. A very excellent pill for continuous use is the following:

℞. Aloin, gr. $\frac{1}{5}$;
Ext. belladonnæ, gr. $\frac{1}{8}$;
Fel. bovis inspissat., gr. ij.
Fiat pil. No. j.
Sig. One or two pills at bed-time.

[1] *Functional Nervous Diseases*, by George T. Stevens, M. D., 1889.

Phosphate of sodium given every morning acts freely upon the biliary secretions and is highly recommended by Bartholow.

For the treatment of the paroxysm a large number of remedies have been advised. Until recently the different combinations of the bromides were in great repute, but the addition of the aniline products to the Pharmacopœia has replaced the former to a great extent. Among the coal-tar products those of principal importance are antipyrine, phenacetin, and acetanilid. White[1] and Robertson[2] were the first physicians who gave antipyrine in headaches. It is now universally employed in the treatment of headaches of various kinds and in neuralgias. It has the disadvantage of being a proprietary remedy of which we do not know the exact composition, but having the great merit of being perfectly soluble and tasteless, it is readily taken and is rapidly absorbed.

Not more than 5 or 10 grains of antipyrine should be given at a dose; it may be repeated every half hour until 20 grains have been taken, but I do not think it can be used in all cases with safety in larger doses than these. Its efficacy is increased by the addition of 10 or 15 grains of sodium bicarbonate to each dose. Antipyrine may be advantageously combined with salicylate of sodium, and an effervescent salt of the two has been prepared which is quite palatable.

Phenacetin should be used in the same doses as antipyrine. In my experience it is a less depressing remedy, and does not produce cyanosis as frequently as antipyrine and antifebrin. Phenacetin may be administered in a capsule, or a finely triturated powder may be placed upon the tongue and washed down with a swallow of water. Its action is perhaps not quite as rapid as that of antipyrine, but it is satisfactory in most cases. It has been found useful in the headache associated with the "grippe" which has been prevalent in this country for the last two years. Phenacetin may be given in combination with salicylate of sodium or salol with advantage.

Acetanilid has been used very freely in cases of migraine, and most of the largely-advertised proprietary remedies for headache probably consist essentially of this preparation. It is objectionable on account of its depressing influence upon the heart in some cases, and a tendency to produce cyanosis. I do not consider it so safe a remedy as either phenacetin or antipyrine. This preparation may be used, however, by giving digitalis with it, and there are a great many cases which it suits very well.

Caffeine is a very efficacious remedy if given early in the attack, but it seldom does good after the headache has become severe. Seguin thinks it is most useful in those cases in which the ocular phenomena

[1] *Annual of the Universal Medical Sciences*, vol. iv. p. 444.

[2] N. Y. *Med. Record*, 1887, vol. i. p. 517.

are prominent as premonitory symptoms, such as hemianopsia or hazy vision.

Dr. E. J. Overend,[1] who is himself a sufferer from migraine, expresses the opinion that caffeine is as complete a specific in migraine as quinine in malarial fevers. He advises the use of citrate of caffeine in doses of from 3 to 5 grains as soon as the first indication of an attack is felt.

The citrate of caffeine is not as effective a preparation as pure caffeine, and the popular effervescing preparations of a bromide and citrate of caffeine are not to be relied upon for the effect of caffeine. The best way to employ caffeine is to give a powder of 1 grain at the very onset of the attack, and repeat the dose every quarter of an hour until four or five doses have been taken. These powders are conveniently carried in the pocket and can be taken without the addition of water. We must remember that this drug sometimes produces an excited and tremulous condition of the patient, and occasionally considerable palpitation of the heart.

Aconitine (Duquesnel's) sometimes gives relief after the pain has become severe: $\frac{1}{200}$ grain may be administered every hour until some sense of numbness is felt. It would not be wise to give more than four doses.

Guarana is also of use, and may be given either in powder, the fluid extract, or as an elixir. Its potency depends upon the caffeine which it contains, and therefore it is hardly to be preferred to the pure alkaloid. I have, however, seen excellent results from the administration of 10 grains of powdered guarana with 5 grains of salicylate of sodium every ten or fifteen minutes until three or four doses have been given; and this combination has the advantage of being absolutely harmless, so that a patient may be trusted to take as many doses as are necessary to relieve the pain without fear of unpleasant effects.

The bromides answer in some cases, especially where there is considerable hyperæmia, the so-called angio-paretic variety, and I have found the bromide of lithium the most eligible. The bromide of nickel has been recommended by DaCosta, and has been found useful. One of the bromides combined with chloral is occasionally of more value than bromide alone. Croton-chloral sometimes gives relief, and is more especially indicated in the cases in which the branches of the fifth nerve are implicated.

Seguin suggests a hypodermic injection of hyoscyamine, $\frac{1}{50}$ of a grain. The oil of eucalyptus occasionally affords relief in cases of migraine. It should be administered in capsule, 5 minims, and repeated every half hour until four doses have been taken. It is

[1] *Pacific Medical Journal*, Jan., 1889.

to be given in the intervals between the attacks as well as during the paroxysm.

Salicylate of sodium has been recommended for the relief of headache, but it is liable to produce nausea, and is objectionable on this account. If, however, it is given in the effervescent form, it is less likely to disturb the stomach. A good way to administer it is to give 5 or 10 grains of the salt in a half-tumblerful of water made effervescent by the addition of a dessert-spoonful of the granular citrate of caffeine. This combination is often efficacious, especially when the attack has been induced by exposure to cold.

A number of writers have recommended morphine hypodermically for the relief of the pain, but I believe it should always be avoided if possible. The habit is easily formed, and the patient frequently suffers from the depression and disordered digestion due to the morphine after the attack.

Besides the internal remedies of which I have spoken, there are a number of external applications which have given relief in certain cases, but they are not so reliable as the drugs. The application of heat to the head, or sometimes cold, freezing applications, or a spray —as, for instance, the methyl chloride of Jacoby—affords relief.

Sinapisms or other counter-irritants are relied upon by some patients, and the menthol preparations, either the solution of the crystals in alcohol or a menthol cone, have for some time enjoyed a reputation for the relief of headache.

The bisulphide of carbon as an irritant has been recommended. Its odor, however, is objectionable, but this can be masked to some extent by essence of peppermint. In some cases in which the pain begins in the forehead an application of a 2 per cent. solution of oleate of aconitine at the very onset will check the attack.

Galvanism is sometimes found of use during the paroxysm, but the faradic current is stated by Gowers to aggravate the pain.

For the preventive treatment the prolonged use of galvanism is, I think, undoubtedly of value. It should be very carefully applied to the head, and the applications should be of short duration—not more than four or five minutes at each time.

The question often arises whether it is better for a patient to keep up during an attack and try to attend to his business or various duties, or whether he should give up at once and retire to his room. My own experience is that, where it is possible so to do, it is far better for a patient to give up at once, take the suitable remedies, and lie down for an hour or two. In this way an attack will often be aborted, and the wear and tear on the whole nervous system by a severe paroxysm is thus saved.

The most efficient remedies are seldom of value in migraine unless

they are taken at a time when a patient can get quiet and repose. When it is possible the best way to shorten a paroxysm is to administer a full dose of the drug which is indicated, and let the patient lie down in a darkened room, with hot applications to the head as well as to the feet. A writer in the *Medical Record*[1] says that headache almost always yields to the simultaneous application of hot water to the feet and head.

When antipyrine, phenacetin, or acetanilid is given, it is particularly important that the patient should lie down for at least half an hour after the administration of the remedy. If the patient is obliged to keep up during the paroxysm, it is better to give remedies like caffeine, guarana, or one of the bromides.

## Headaches of Childhood.

Children are more subject to headaches than is generally realized, and the attacks may begin at an early age. I have seen children two years of age with every evidence of migraine. Children are usually uncomplaining about pain in the head, and if they do speak of it are likely to continue their play as if they had forgotten it. The pain, however, may be quite severe. Before a child is able to talk evidences of pain in the head are shown by irritability, crying or fretting, the expression of the face, and objection to light.

The varieties of headache in children most commonly met with are migraine, anæmic and organic headaches, and the reflex headaches, such as those from eye-strain, nose and ear disease, and genital irritation. Ollivier[2] does not believe that any special type of headache can be regarded as due to the period of growth. Careful examination will generally show that the headaches are the result of ocular defects, inanition, hysteria, or some other definite cause, rather than to growth alone.

Allan McLane Hamilton[3] remarks that "neuralgic pain is rare in infancy, or at least until after the fifth year, when headaches of the migrainous type are found commonly among overworked school-children or as the sequelæ to some malarial or typhoidal fever. Trigeminal neuralgia is more common in girls, and is often associated with eczema. It is safe to assume, however, that severe head-pain in young children is an alarming symptom, especially if the pulse is irregular and feeble. The headache is usually general or may be confined to the frontal region. Intense headache, with associated photophobia, sensory hyperæsthesia, and constipation, is as a rule highly characteristic of meningitis. The variety of headache of the lighter grade which appears in children after the third or fourth year is to all intents and purposes a

[1] July, 1891.

[2] *Medical Age*, Dec. 28, 1889.

[3] *Cyclopædia of the Diseases of Children*, Keating, vol. iv. p. 450.

hemicrania. It is developed by fatigue or undue strain at a time when the brain is attaining its early development, and is aggravated by errors in diet and management. It is associated with gastric irritation, nausea, and loss of appetite, and usually begins in the morning. In many respects it resembles the ordinary sick headache of the adult."

Migraine in children can usually be traced to direct hereditary transmission, or there may be only a neurotic history. It may be handed down through several generations, although occasionally it is absent in one generation and reappears in the next. In large families we often see several members who have immunity from this affection notwithstanding a marked hereditary tendency. Hereditary transmission is said by Seguin[1] to be more frequent and marked through the mother to the female children.

The character of the attacks which children have is often similar to those of the parents, presenting the same ocular phenomena, such as hemianopsia, scotomata, and dimness of vision. The character of the attacks also is likely to continue the same after adult age.

Eye-strain is a frequent cause of migraine in children, and the fact of the paroxysms frequently commencing at the age of seven or eight, the time when a child usually begins to attend school, points to the connection between defective eyesight and the headaches.

We may also note that migraine may be due to nasal irritation and obstruction, as has been previously mentioned. Children who have chorea often suffer from attacks of migraine, and it is also often found in cases of chorea that there has been a previous history of headaches.

Frequently the attack begins with some ocular phenomena, although as a rule this is not noticed by the child unless he is several years old. Usually on awaking, or soon after, there is a deep-seated pain in one side of the head. This increases in severity, and is accompanied by dulness, coldness of the extremities, and flushing or pallor of the face. After a time there are nausea and vomiting, and if the patient falls asleep after vomiting he will usually awaken free from pain.

The attacks occur with considerable regularity every two to eight weeks, and in girls after the appearance of menstruation the paroxysms are most likely to occur at the catamenial period—not, however, because of any direct influence from this function upon the disease, but because the catamenia is merely an exciting cause of an attack in a person predisposed to it.

We must remember that the nausea and vomiting which are such frequent symptoms of the paroxysm do not depend upon any disorder of digestion or upon the taking of improper food. The nausea is a result of the nervous disturbance, and very frequently the act of vomiting brings from the stomach little but mucus and bile after

[1] *Cyclopædia of the Diseases of Children*, vol. iv. p. 829.

considerable retching. It is not desirable for a child to take food during an attack, as gastric digestion seems to be to a great extent arrested, and if a meal has been eaten while the pain is severe the contents of the stomach are often vomited unchanged after several hours.

In childhood the attacks are not as long as in adults. They seldom last more than a few hours, and rarely an entire day. As soon as a paroxysm begins it is best to keep the patient quiet in a darkened room and endeavor to induce sleep by the surrounding conditions. If the pain is severe, give small doses of antipyrine, 3 or 4 grains to a child of eight years, combined with digitalis. One or two doses of caffeine may be given at the onset in cases accompanied by ocular prodromes, and guarana in the form of powder or fluid extract is sometimes effective. Use external means also, applying an ice-bag to the head if it is hot, and hot water to the feet. Menthol or aconitine may be applied to the forehead should the pain be frontal. Massage to the skull is sometimes very soothing to children, often enabling them to fall asleep without the aid of any other remedy.

In children the treatment between the paroxysms consists largely in attention to the general health in the first place, correcting any ocular defects and relieving any catarrhal or obstructive conditions of the nose. It is important to remove any sources of genital irritation, such as contracted prepuce or pruritus.

Cannabis indica, combined with iron and arsenic, should be given for long periods, but the principal point is to make the hygienic conditions of the child as good as possible. We should insist upon plenty of out-door exercise, gymnastics, daily bathing and friction of the skin, and regular early hours for going to bed and rising. The condition of the school-room as to light, ventilation, and the desk at which the child sits are of the utmost importance. Many cases of migraine are very much aggravated in children, if not originated, by the poor light and imperfect ventilation of the school-room ; and we should remember that the establishing of migraine in childhood means the persistence of the attacks throughout life.

Moncorvo[1] has lately employed exalgin (methyl-acetanilid) in the treatment of infantile neuralgia and migraine. His statement is to the effect that he has definitely seen migraine and neuralgias, which had been of long duration and had resisted other therapeutic agents, disappear under the administration of exalgin. One case may be cited somewhat in detail : On the 26th of August, Moncorvo admitted into his service a little negro of eleven years, thin, rachitic, presenting the manifestations of malaria, and having the liver and spleen engorged. The family history was tubercular and neurotic. For several weeks this little boy had suffered from attacks of migraine on the right side,

[1] *Bulletin général de Thérapeutique*, May 30, 1891.

accompanied by photophobia of the same side. These attacks often lasted more than a day, and obliged him to give up everything. During the first two days after his admission calomel, benzoate of sodium, and quinine were administered in order to disgorge the liver and spleen. Notwithstanding this, a new attack of migraine came on on the 28th, which caused him to prescribe exalgin in the dose of 20 centigrammes (3 grains), to be taken in three doses in the twenty-four hours. The next day he was notably improved, having been able to sleep the preceding night. The exalgin was continued for two days, and after 60 centigrammes (9 grains) had been taken there was a total disappearance of the attacks of migraine.

The writer considers that exalgin surpasses in activity antipyrine, and it is to be preferred to this analgesic in infantile therapeutics on account of the smallness of the dose and the freedom from after-effects.

Lithæmia may exist in children as well as in adults, and we should treat this by abundance of exercise, care in diet, and alkaline waters. Starchy and saccharine food should be avoided by those who show any tendency to lithæmia, such as brickdust deposit in the urine, coated tongue, and heavy breath. The habit of giving children an excess of starchy food combined with sugar tends to produce lithæmia. It is very common to find that children, even up to twelve or fourteen years of age, habitually make a breakfast consisting almost entirely of oatmeal or some porridge with cream and large quantities of sugar, to which is added some griddle-cakes and syrup.

Many children who suffer from attacks of migraine are pale and badly nourished. Cod-liver oil is of the utmost value in these cases, especially when alternated with iron and arsenic. These cases are often deficient in fat, and the addition of fatty substances to the diet is always of value to them, provided that they can be assimilated.

Day mentions school headaches in children, and expresses the opinion that they are generally hyperæmic. He speaks of the flushed face and dull, heavy expression of these children. However, they may be anæmic or asthenopic. They are usually accompanied by a sense of fatigue in the eyeballs and forehead, and occur after the school-hour. As is the case with migraine, they frequently depend upon refractive errors of the eye, and are usually relieved by proper glasses.

We should remember that the eyes of children may change considerably within a year or two. In a patient recently under my care the degree of astigmatism changed so much in two years that complete change of glasses has been necessary.

Children may also have headaches from digestive disturbance : those who eat too much or too rapidly are subject to them, the attack coming on from one to three hours after a meal.

Jules Simon[1] makes seven different groups of headaches in children. Among them are the headaches of growth. They are frontal, increased by work, and coincident with pains of the joints, periosteum, and cardiac hypertrophy.

Children may have headaches due to anæmia. The general appearance of the child is frail, pallid, and chlorotic. The headache is dull and constant, and is increased by exercise.

The indications are to improve the general health by care in diet and the administration of iron and arsenic, removing the child from school, and giving him plenty of exercise in the fresh air. In these cases massage is of value.

There are also headaches in children due to a variety of other causes. For instance, in disease of the heart mitral insufficiency may be a cause of constant, dull, heavy headache. Disease of the ear, accumulation of wax, or the presence of foreign bodies may give rise to headache. Enlarged tonsils, as I have remarked elsewhere, is a frequently unrecognized source of headaches in children. I have often seen persistent headaches caused by hypertrophied tonsils, and associated with the headaches not only great irritability of temper, but dulness of intellect. After the removal of the tonsils, either by excision or treatment by galvano-cautery, the greatest change takes place in the intelligence, growth, and morale of the child. Sometimes it is the presence of the adenoid growths in the pharynx, the so-called pharyngeal tonsils, which gives rise to the obstruction and headache. These are very readily removed.

Children may have malarial headaches, which are manifested as a dull frontal pain, and they are usually accompanied by febrile symptoms. Sometimes the attacks present a distinct periodicity.

Genital irritation is sometimes a cause of constant headache or head-discomfort in children. Seguin[2] says that one of the worst cases of occipital headache he ever saw in a child was cured by circumcision.

In organic cerebral disease pain is a constant symptom. The pain of meningitis, especially that of the tubercular variety, is well known, and occasionally we meet with syphilitic headaches in children. In this form there is usually exacerbation of the pain at night. The pain of organic cerebral disease in children is usually sharp and intense, causing the child to cry out or complain loudly. When it is due to meningitis or tumor in the cerebellum, it is usually located in the occiput, and there is associated with it rigidity of the neck-muscles.

In almost all cases of headaches in children, not organic, when we

[1] *Medical and Surgical Reporter*, July 11, 1891, from *Revue des Maladies de l'Enfance*, May, 1891.

[2] *Op. cit.*

do not find any reflex causes there will generally exist some defect in the nutrition or hygienic surroundings of the patient.

General tonic treatment and correction of dietary errors will be found more useful than any special drugs that can be given. When palliatives are necessary, antipyrine or the bromides may be administered. Chloral is occasionally necessary, and in organic headaches we are sometimes obliged to administer morphine, but it is very important to avoid, as far as possible, the use of this drug. In cases of migraine or reflex headaches the relief afforded by an opiate is seldom complete, and the recovery from the attack is not as good as when opium has not been used. Moreover, as we have already stated, the liability to form the morphine habit is a danger that we should invariably bear in mind. It is true that a number of good authorities recommend and justify the use of morphine, hypodermically and by the mouth, in different varieties of headache, but I am more and more convinced of the danger of using it.

### Constant Chronic Headache.

We frequently meet with patients who tell us that they suffer continually from headaches which are more or less severe. These headaches may be due to various causes, and may belong to one of the different varieties previously described. I believe, however, that when a person has persistent headache sufficiently severe to be constantly recognized, it is often due to meningitis or, at any rate, to meningeal irritation.

Patients speak of having two or more headaches of different forms; for example, one may have a constant headache, and in addition attacks of migraine or of rheumatic headaches. These constant headaches are usually dull in character, and may be either frontal or occipital, but are most frequently the latter; for example, the occipital ache which sometimes replaces migraine after forty-five or fifty years of age. There are occasionally exacerbations of pain, and sometimes the pain becomes less, amounting at times to merely a sense of discomfort. This form of headache is seldom due to eye-strain, for I have seen cases in which errors of refraction have been properly corrected without relief of the headache. The following case is a good example of constant chronic headache:

H. I——, forty-three years of age, a well-educated and intelligent man, began to suffer with headaches at about the age of twenty. He has never since that time been free from some sense of discomfort in his head, and the greater part of the time there is marked pain. The pain is usually frontal or occipital, but most of the time is occipital, and sometimes it extends down the spine as far as the waist. He sleeps fairly well, but awakens in the morning with severe pain in his

head. His general health is fairly good; he has a good appetite, good digestion, and is able to take a moderate amount of exercise. Mental operations, such as study or even writing a note, will make the head-pain worse. He thinks that he is naturally of a cheerful disposition, but since having this continuous head-pain he is despondent and has a sense of some impending misfortune; he feels as if a fate were hanging over him. He describes a variety of singular head-sensations, and speaks of "a kind of quivering inside of his head," which he likens to a rock which has fallen and is balanced on the edge of a precipice. His eyes have been carefully examined and are practically normal.

Dr. Mitchell has written an interesting and instructive lecture on "permanent headache."[1] He refers to a clergyman who for "eleven years had headache which was sufficient to give his face an expression of suffering, and yet during all this time wrote sermons of unquestionable ability and attended to the wants of a considerable parish." He thinks that very frequently those cases of permanent headaches which, although originally due to eye-strain, have been unrelieved by proper glasses, are the result of injury to the brain-tissues from too protracted strain. He has often met with constant headaches the result of asthenic conditions, and has cured these by the rest treatment.

He also refers to two cases of permanent headache which were associated with asthma. He speaks of the headaches of hysteria, which he says are often permanent. In most of these cases of permanent headaches Dr. Mitchell thinks that to raise the health level is a means of enabling drugs to act more favorably.

The treatment of constant chronic headaches by any means is at the best unsatisfactory, although we are often rewarded for a careful study of the case by finding some condition which we may relieve by treatment. For instance, they may be the result of some ocular defect, a gouty habit, or some error in the mode of life.

In cases of persistent constant occipital headache which, I believe, are often due to a low grade of meningitis, we will frequently find relief from the long-continued use of minute doses of the bichloride of mercury and counter-irritation by means of Paquelin's cautery to the back of the neck. Change of climate and travel, and especially visits to watering-places where baths and the "movement cure" are employed, will prove of decided advantage, and will sometimes accomplish the cure of cases which have resisted all treatment at home.

[1] *International Clinics*, October, 1891.

## NEURALGIA.

The treatment of neuralgia is practically the same in different parts of the body, and depends more upon the variety of the neuralgia than upon its location.

Neuralgia may be due to actual disease or inflammation of a nerve-trunk—a neuritis—or it may exist without any structural change in the nerve. The alterations in the nerve may be simply molecular, and not capable of being demonstrated by any means that we have; but the way in which an idiopathic neuralgia behaves—for instance, its sudden disappearance from one part to reappear in another, or its complete relief after a comparatively short time—confirms the belief that it is not due to organic change in the nerve.

We should then divide neuralgias into two forms: the symptomatic, in which the pain depends upon a neuritis or some other structural change in the nerve; and the idiopathic, in which the pain does not depend upon any change that can be detected in the structure of the nerve.

Neuralgia from neuritis may exist in any of the nerves, but it is most frequently met with in the sciatic nerve and in some of the branches of the fifth nerve. The character of the pain differs but little in either the symptomatic or idiopathic variety, but the symptoms accompanying the pain are different. For instance, in neuritis there is much more pain and sensitiveness over the nerve-trunk than in idiopathic neuralgia.

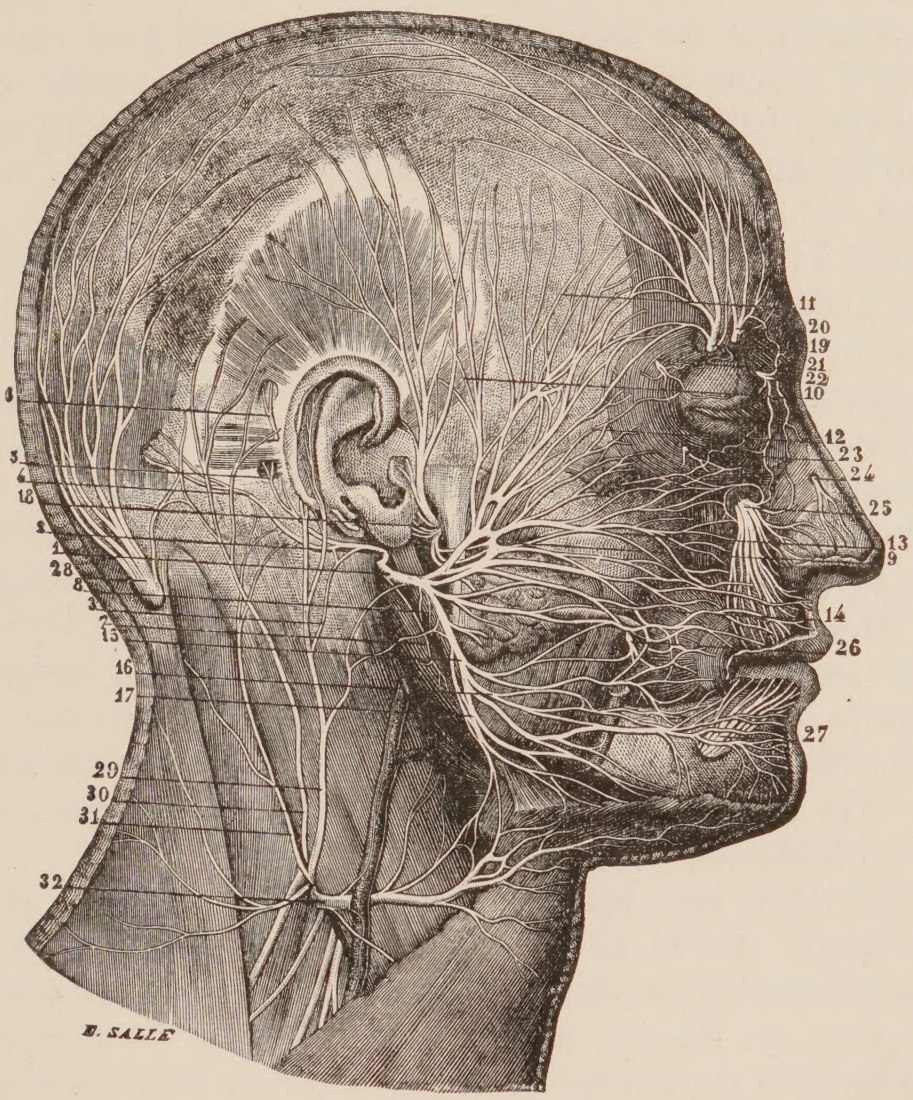
### Neuralgia of the Fifth Nerve.

The fifth nerve is probably more frequently affected than any nerve in the body, and the varieties of neuralgia of the fifth are numerous. When we consider the number of branches of this nerve, its exposed situation, and its important functions, it is not remarkable that such is the case.

One branch alone may be involved or all of the branches at the same time. The supraorbital is most frequently affected, and it is in this nerve that some of the headaches seem to begin. The attacks of brow-ague which have already been alluded to are located in this nerve. The pain is felt most markedly in the supraorbital notch, and extends over the forehead and as far back as the parietal bone. In supraorbital neuralgia there are certain tender points to be discovered. One is just above the notch, one in the outer part of the upper eyelid, one at the emergence of the nasal branch, and sometimes one apparently in the eyeball. There is often a point at which the pain is intense in the parietal bone about three inches above the ear. This point corresponds to the termination of some of the branches. Pain

in this nerve is frequently the result of exposure to cold, but it may be due to other causes. Occasionally intense pain is felt in the supraorbital nerve after taking a very cold substance, like ice-cream,

FIG. 2.




SUPERFICIAL BRANCHES OF THE FACIAL AND THE FIFTH: 1, Trunk of the facial; 2, Posterior auricular nerve; 3, Branch which it receives from the cervical plexus; 4, Occipital branch; 5, 6, Branches to the muscles of the ear; 7, Digastric branches; 8, Branch to the stylo-hyoid muscle; 9, Superior terminal branch; 10, Temporal branches; 11, Frontal branches; 12, Branches to the orbicularis palpebrarum; 13, Nasal or suborbital branches; 14, Buccal branches; 15, Inferior terminal branch; 16, Mental branches; 17, Cervical branches; 18, Superficial temporal nerve (branch of the fifth); 19, 20, Frontal nerve (branches of the fifth); 21, 22, 23, 24, 25, 26, 27, Branches of the fifth; 28, 29, 30, 31, 32, Branches of the cervical nerves (*Hirschfeld*).

into the stomach, and it may also be secondary to inflammation of the lining of the frontal sinus.

Infraorbital neuralgia is generally associated with neuralgia in one of the other branches of the fifth, but occasionally it is felt alone. Most frequently pain is felt at the emergence of the nerve from the foramen. Pain in the inferior dental nerves is frequently associated with caries of the teeth, but it may be due to exposure to cold or to rheumatic or other influences.

Neuralgia of this nerve comes on usually after middle age, and in

old persons is very difficult to cure. The suffering is most intense, and life becomes unbearable from the violence and persistence of the pain. Tic-douloureux or prosopalgia is the variety in which, associated with the attacks of pain, are convulsive twitchings of the muscles of the face. Trousseau has given the name "epileptiform neuralgia" to a form in which the pain comes on suddenly with great violence and lasts only a minute or two. The frequency of the attacks varies in different cases, but they may recur every few minutes during the entire day, and the excruciating agony suffered by the patient can hardly be described.

Putnam has added some valuable facts to the pathology and treatment of neuralgias of the fifth pair. He speaks[1] of the relationship between migraine and supraorbital neuralgia—a connection which was also recognized by Anstie—and he believes that this is confirmed by the fact that persons who suffer from migraine are sometimes liable to have attacks of supraorbital and occipital neuralgia. Dr. Putnam states further that he has examined nerves which had been removed from eight patients who had been operated upon for trigeminal neuralgia. More or less marked changes were made out in all but three of these nerves. The slighter changes consisted in an infiltration of small nerve-cells in the nerve-sheath around the vessels and amongst the nerve-fibres themselves, especially in the neighborhood of the sheath. He also found in some of the nerves degenerated changes in the axis-cylinder and nerve-tubes.

Various views have been advanced as to the pathology of trigeminal neuralgia. Dr. C. L. Dana[2] considers that the condition depends upon an obliterating arteritis of the nutritive vessels of the nerve. The reasons given are that the disease occurs at an age when degenerative changes begin in the arteries and follow a certain fixed vascular distribution. In an examination of various specimens of the superior maxillary nerve removed from typical cases of tic-douloureux there was no noteworthy change of the nerves found, while in three specimens there was striking evidence in vascular disease. The therapeutic evidence deduced from the favorable action of aconite, which lowers tension, is given as favoring this view. As the removal of the peripheral nerve may effect a cure, it is considered that the neuralgia is the result of some local peripheral irritation.

Quenan and Lipais are quoted as finding the existence of a closer and more extensive relationship between the blood-vessels and the nerve-trunk than has usually been supposed.

We must bear in mind that these nerves which have been examined by Putnam, Dana, and others were from cases in which there were

[1] *Boston Medical and Surgical Journal*, Aug. 13 and 20, 1891.

[2] *Medical News*, May 26, 1891.

evidences of neuritis, and in which the nerve to the naked eye probably showed evidences of inflammatory changes. Several cases have been described in which the inferior dental nerve has been excised and found swollen and red. For instance, Tuffier reported a case of neuralgia of the lower jaw in which the nerve was found swollen and reddened both within the dental canal and before its entrance.

I have recently seen an interesting case of neuralgia of the inferior dental in which neuritis was distinctly shown by the extreme hyperæsthesia in the distribution of this nerve. The patient, a woman of forty-six years, had suffered for three or four weeks from neuralgia in the lower jaw. One or two suspected teeth were extracted without relief, and galvanism was resorted to for the pain. After the application of a strong current, in which a reversal of the poles was made, she experienced a hyperæsthesia in the skin over the lower jaw. When I saw her she was suffering but little acute pain in the nerve, but there was exquisite hyperæsthesia confined accurately to the skin-distribution of the inferior dental nerve, ceasing exactly at the median line of the chin and extending to the margin of the lip.

S. Ehrmann[1] has collected some cases, which he published in the *Neurologisches Centralblatt*, in regard to the production of severe trigeminal neuralgia following the administration of even small doses of potassium iodide. Fifteen grains produced in a strong man, aged thirty-five years, most intense pain in the forehead and in the teeth, with sensitiveness over the area of distribution of the fifth nerve. It was associated with lachrymation and injection of the conjunctiva. These symptoms disappeared, only to be followed by their reappearance when the drug was again administered. Three other cases of a similar nature are also cited.

The treatment of neuralgia of the fifth nerve is more or less successful, depending upon the age and general condition of the patient. However, it should be regarded generally as a most intractable disease, and the long list of remedies which is to be found is evidence of the difficulty of curing it.

In many cases of trigeminal neuralgia treatment directed to the general health is capable of relieving the pain. Iron and arsenic have been found useful remedies, the precipitated subcarbonate of iron in large doses being especially valuable. Gelsemium is a remedy of distinct potency in the treatment of these cases, and it is particularly adapted to those forms which depend upon dental caries. I have found, however, that it is useful in the treatment of neuralgia of all the branches of the fifth. The fluid extract is the best preparation, and as the strength of this preparation is variable, it is best to begin with a small dose and gradually increase it until the toxic effects

[1] *Lancet*, May 2, 1891.

are felt. It is well to keep a patient under the influence of the drug for some days—just on the verge of the extreme dose, so that a slight dizziness or dimness of vision is felt for a time after taking a dose of the remedy.

Cannabis indica is also a useful remedy, and should always be given in full doses, pushing it up to the point of tolerance.

Phosphorus has been recommended by Thompson in large doses, but most other observers have failed to find it of great efficacy, and, moreover, it is very irritating to the stomach; however, there are cases in which it is useful. Gowers, for instance, describes a case of a woman of forty-three years, with neuralgia of the fifth nerve of thirteen months' duration, who was entirely relieved after three months' treatment with phosphorus.

Phosphide of zinc may also be given. Belladonna has been recommended, but it very seldom gives marked relief. Aconitine is strongly recommended by some writers, among them Seguin. It is undoubtedly a remedy of value, although it must be given with caution. Duquesnel's aconitine should be used in doses of from $\frac{1}{250}$ to $\frac{1}{100}$ grain, and it should be pushed until slight tingling and numbness are felt in the face or lips.

Cimicifuga—*Actea racemosa*—has been recommended in those forms connected with rheumatism, and it may be given in combination with cannabis indica.

Croton chloral—butyl chloral—has been recommended by many writers, Ringer and others. H. A. Hare[1] has recently written on its use in trigeminal neuralgia. He gives it in doses of 5 grains every two hours, and has found that its influence is curative as well as palliative.

Sometimes a combination of a nervine and a tonic is of value. Gowers says that he has found the simultaneous administration of arsenic, quinine, and Indian hemp of great service. The prolonged use of cod-liver oil is undoubtedly of great value in many cases. In some forms—as, for instance, in inferior dental neuralgia, in which there is reason to suppose that there is periosteal thickening—the iodide of potassium is indicated; indeed, remarkable results have been obtained from the administration of large doses of this salt in trigeminal neuralgia independent of periostitis or syphilis.

For local applications various remedies have been suggested, and have proved useful in different cases. Counter-irritation is uncertain, and acts merely as a palliative during the severe paroxysms. Menthol in the form of a cone or in alcoholic solution, or oil of peppermint, has often afforded relief.

[1] *Medical News*, May, 1889.

Aconitine and veratrine in ointment or as an oleate will temporarily dull pain. Bartholow recommends the following:

℞. Veratrinæ, 2 parts;
Acid oleic, 98 parts.—M.
Sig. Oleate of veratrine.

℞. Veratrinæ, 4 parts;
Alcohol, 6 parts;
Adepis benzoinat., 96 parts.—M.
Sig. Veratrine ointment.

Flying blisters over the points of emergence of the nerve are sometimes of lasting benefit, but the actual cautery is of more permanent good, although, for obvious reasons, its application to the face is objectionable. I have seen one patient with excessive pain in the lingual branch of the fifth completely relieved for two years by the application of the actual cautery to the painful point in the side of the tongue.

Cocaine, injected hypodermically in the course of the nerve, has afforded temporary ease from pain, but it is an unsafe remedy.

Camphor chloral—that is, a solution made by rubbing together equal parts of camphor and chloral, which liquefies—is often very beneficial; it may be applied on lint and covered with oil-silk.

Electricity, when judiciously applied, is of great value. The faradic current in my experience is not beneficial, and sometimes aggravates the pain. The galvanic current is of decided potency in many cases. The direction of the current is a point to be considered, and much discussion has taken place as to which pole should be placed over the seat of pain. Gowers thinks that the direction of the current is of but little importance. My own experience is that the negative pole should be placed over the painful point and a mild current passed for two or three minutes. A well-wetted sponge should cover the electrode. This should be placed over the painful nerve and the other pole at some indifferent point. After the electrode is in contact with the skin, the current should be gradually turned on, and the strength should be 2 or 3 milliampères. Before removing the electrode the strength of the current should be reduced. Any sudden change in the strength of the current is to be carefully avoided, and reversing the current is a most dangerous procedure. The application should last for two or three minutes, not longer than five minutes, and it should be used daily, and sometimes, when convenient to do so, it is well to make two or three short applications each day.

Static electricity has proved effective in some cases in which galvanism has failed; it is used by drawing sparks from the painful region with the negative pole.

Antipyrine sometimes is effective in facial neuralgia, and salicylate of sodium or salol is beneficial, especially where there is a rheumatic complication. Dercum has reported some cases of relief of extreme neuralgia of the fifth by large doses of salicylate of sodium.

Fraenkel[1] reports a new plan of treating trigeminal neuralgia. He gives a hypodermic injection of cocaine in the affected place, and then applies a strong current of faradic electricity, placing one pole at the foramen of exit and the other half an inch distant.

Leslie[2] reports sudden and immediate cure of many cases of facial neuralgia from the application of powdered salt to the nasal mucous membrane.

In many cases of facial neuralgia, especially in old persons, all medicinal means fail to afford relief, and we are then compelled to resort to surgical interference.

The results of excision of the nerve are more or less satisfactory. In all cases there is relief for a longer or a shorter time, but generally there is return of the neuralgia.

Nerve-stretching has given relief for the time, and simple section of the nerve is often succeeded by immunity from pain for several months. It is best, however, to excise as large a portion of the nerve as possible, and the nearer the ganglion the nerve is cut the better.

Edmund Andrews[3] having removed a portion of the inferior division of the trigeminal nerve, the patient returned in a year and a half complaining of great pain and asking for a second operation. The old cicatrix was incised, and, catching hold of the nerve as deep down as he could, he forcibly drew upon it and twisted it until it came away. While no nervous tissue was discovered in the part which was removed, the nerve-stretching and the removal of the stump from the cicatricial tissue gave relief to the patient.[4]

Rose[5] has trephined the skull and broken up the Gasserian ganglion. The ganglion of Meckel has been removed also.

Ledentu[6] has relieved a neuralgia of the lingual nerve of five years' standing by stretching the lingual nerve. Other instances of relief of neuralgia by nerve-stretching have been reported, but the operation has not proved a satisfactory one, as the relief is generally of short duration, and sometimes a serious neuritis is set up.

When surgical interference becomes necessary, excision of the nerve

[1] *Medical Bulletin*, Mar. 15, 1890.
[2] *Edinburgh Medical Journal*, Jan., 1890.
[3] Quoted in *Lancet*, Mar. 7, 1891.
[4] *Medical News*, Feb. 14, 1891.
[5] *Lancet*, Nov. 1, 1890.
[6] *Medical Treatment of Headaches*, by Allen McLane Hamilton, M. D., 1886.

is by far the most satisfactory means, and the trunk of the nerve should be divided as near as possible to its exit from the foramen. In some cases it is desirable to remove the nerve even farther back than the foramen by drilling through the bone. Vandeveer[1] has reported two cases of relief of infraorbital neuralgia by removal of the ganglion of Meckel. The operation is described at length by him. Putnam[2] recommends operative interference in severe cases without waiting to try the effects of remedies, as he considers the results of excision satisfactory when properly performed; that is, when a large portion of the nerve has been excised. The results of the operation, however, are not sufficiently permanent to resort to excision without having first exhausted all medicinal means at our command. Besides, we must not forget that there are sometimes cases which seem to be cured spontaneously, and there are several cases on record in which strong mental impression permanently relieved severe neuralgias of the face. Le Fort[3] mentions a case of obstinate lingual neuralgia which ceased during the siege of Paris and returned afterward. Putnam quotes the case of Sir John Lawrence, who had suffered excessively from facial neuralgia, and when the news of the Indian mutiny was brought to him the neuralgia at once disappeared, not to return.

I have seen a case of severe tic-douloureux in a woman of seventy-five years, in which the paroxysms were frequent and most violent, associated with excessive hyperæsthesia of the face, so that the patient was unable to use her handkerchief, become comparatively comfortable under the use of gelsemium and tonic treatment. The patient is now easy as regards pain, and seldom has any attacks of sufficient severity to annoy her.

Notwithstanding the fact that in many cases the relief from excision is not permanent, one must realize the intense agony which is endured without cessation for months, and even years, by the victims of facial neuralgia, and be prepared to resort to extreme measures should the case not yield to simpler remedies.

The operation of excision is not a grave one, and we can always promise relief for two or three years, and perhaps longer, and in those cases in which resection of the nerve has been done as far back as the foramen rotundum and foramen ovale the relief is likely to last for a much longer period.

The carotid artery has been ligated for facial neuralgia, but without very satisfactory results.

The use of Jacoby's methyl-chloride spray has been followed with more or less success. The spray should be applied over the painful

[1] *Medical Record*, New York, June 9, 1883. [2] *Op. cit.*

[3] Gowers, *Diseases of the Nervous System*, p. 1165.

points until the skin is frozen. The immediate result of the freezing of the part is anæsthesia. This is followed by hyperæmia and increased tenderness, which subsides after a time with the disappearance of the pain.

Frederick Peterson has made some interesting communications on the diffusion of remedies through the skin by means of galvanism. He refers to the fact that Dr. B. W. Richardson as long ago as 1859 produced local anæsthesia with solutions of morphine, aconite, and chloroform by means of the galvanic current. Peterson has made a number of experiments with different alkaloids, and has found that by using a solution of certain drugs at the positive pole the local effects of the remedy may be obtained. For instance, a 10 to 20 per cent. solution of cocaine on the anode will give relief from severe neuralgia for from four to eleven hours without constitutional effects. He relates two cases of severe chronic supraorbital neuralgia and one of inferior maxillary neuralgia which he relieved for several hours by the anodal diffusion of a solution of cocaine and aconitine. Several other writers have had similar success.

The remedies which Peterson has used are helleborin, cocaine, atropine, ouabain, strophanthin, aconitine, and chloroform. He employs an electrode made of metal and nickel-plated, with a rubber rim, places upon the metal surface a piece of tissue or filter paper or linen, drops upon it the solution of the drug to be used, and applies it to the skin. The strength of the current employed by him is from 5 to 20 milliampères, and may be used for from five to fifteen minutes according to the strength of the current, or, he says, "if one has no galvanometer he may use from ten to thirty or more cells of a Grenet, Léclanché, or chloride-of-silver battery." This I think rather a strong current to be applied to the face.

## Sciatic Neuralgia.

Sciatic neuralgia is another form which we have to deal with frequently, and often taxes the patience of both physician and patient. The treatment of this disease depends to some extent upon whether we have to deal with a neuritis or a functional neuralgia. Neuritis is the most common cause of sciatic neuralgia, and it may depend upon gout and rheumatism. There are certainly some cases in which simple muscular over-exertion will produce it, and it may also be caused by exostoses or tumors pressing upon the nerve in its course. It is much more frequent in males than in females, and generally occurs after the age of forty years. The older a patient the less prospect of relief. The cause of sciatic neuritis is not always to be discovered, but in a number of patients it can be traced to exposure to cold and wet, sitting on a cold stone, or exposure to draughts while the clothing is wet. Occa-

sionally it can be traced to a hard seat on which a patient has been sitting for some time. Associated with it may be tenderness along the nerve-trunk, and sometimes hyperæsthesia in the distribution of the nerve; numbness and tingling and patches of anæsthesia on the back of the thigh and calf are sometimes met with. In cases of long standing the muscles of the leg become flabby, weak, and atrophied. This is most noticeable in the muscles of the calf.

In a case of acute sciatica the pain is sometimes very severe from the onset. It comes on gradually, growing more and more severe.

The distinction between a neuritis of the sciatic nerve and a simple neuralgia is not always easy to make. As a rule, however, there is more tenderness over the nerve in neuritis, and more sensory disturbances in the distribution of the nerve, than in sciatic neuralgia. Sciatic neuralgia is more likely to occur in patients who are weak and anæmic, and it may also be a symptom of locomotor ataxia. There is no doubt that in many cases of confirmed and intractable sciatica the disease is located in the spinal cord, and the pain in the sciatic nerve is merely a referred symptom.

In many cases there is a periodicity in the paroxysms of pain in the nerve, and an evening exacerbation is common. The nights of patients suffering from this disease are distressingly painful, the severity of the pain often causing them to lie awake the greater part of the time. The sitting position often aggravates the pain, partly on account of the pressure of the nerve at the notch, and partly on account of the stretching of the nerve by flexing the leg. Patients often find themselves more comfortable when standing or walking about the room than when lying still, although after walking or standing for a while the pain is aggravated.

In the treatment of sciatica, whether of the inflammatory or idiopathic type, rest is essential, and there is no class of patients more difficult to convince of the necessity for absolute rest, because of the fact that walking about the room often affords temporary relief. In acute sciatica it is best to place the patient in bed and enjoin him to keep the leg extended and as quiet as possible.

Counter-irritation is of great importance from the very onset, and an attack may be aborted by the prompt application of blisters over the seat of pain. Dry cups over the course of the nerve are useful. If the pain is intense, a hypodermic injection of morphine combined with atropine will relieve it temporarily and sometimes permanently. Cocaine has been recommended for its anæsthetic properties, but must be injected deeply and near the nerve-trunk itself to give relief. It is also objectionable on account of the toxic effects which sometimes follow its use. Occasionally, acute cases of sciatica are relieved by the administration of antipyrine and bicarbonate of sodium, and full

doses of salicylate of sodium or salol will sometimes also arrest the attack.

The bowels should always be thoroughly unloaded, as a distended rectum may cause the trouble by pressure upon the nerve. Various sedative liniments and ointments have been used over the course of the nerve with greater or less relief. The menthol cone has been successful in many cases, and an ointment of aconitine or veratrine is sometimes of benefit, but the applications to the skin are seldom efficacious, owing to the depth at which the nerve is located.

In gouty cases the antilithæmic remedies should be used and careful diet insisted upon. Colchicum is a valuable remedy in gouty cases.

The following prescription is recommended by Dr. J. T. Metcalf:[1]

℞. Tinct. aconiti rad.,
Tinct. colchici sem.,
Tinct. belladonnæ, āā. fʒij.—M.
Sig. Six drops every six hours until relieved.

Brown-Séquard recommends the following prescription:

| | |
|---|---|
| ℞. Ext. belladonnæ, | gr. $\frac{1}{6}$; |
| Ext. stramonii, | gr. $\frac{1}{5}$; |
| Ext. cannabis indicæ, | gr. $\frac{1}{4}$; |
| Ext. aconiti, | gr. $\frac{1}{3}$; |
| Ext. opii, | gr. $\frac{1}{2}$; |
| Ext. hyoscyami, | gr. $\frac{2}{3}$; |
| Ext. conii, | gr. j; |
| Pulv. ext. glycyrrhizæ, | q. s. |

M. et ft. pil.

Two, three, four, and even five, of these pills may be given in a day.

In the treatment of a sciatic neuralgia, when the pain is not intense, the patient may be allowed to go about, and in these cases galvanism is of decided benefit. The current should be used daily for several weeks or months, and it is important to apply the electrodes directly over the course of the nerve, pressing them down firmly and deeply so as to reach the nerve as nearly as possible.

Chronic sciatica, whether due to neuritis or simple neuralgia, is very stubborn, and sometimes resists all forms of treatment. Systematic and prolonged treatment is necessary for these cases, and we must insist upon strict obedience to all directions given to the patient. In hospitals it is much easier to carry out all the details of treatment.

The first point of importance is to insist upon absolute rest in bed,

[1] *Medical Record*, Feb. 19, 1887.

and many cases are cured by simply placing the patient in bed and applying a long external splint. The old-fashioned Physick-Desault splint is a convenient form. When rest alone does not afford relief, counter-irritation is necessary, and the application of the Paquelin cautery is almost certain to bring more or less relief. The cautery should be applied at the painful points, and also over the sciatic notch, whether there is tenderness at this point or not. One application is seldom sufficient to effect a cure, and it is sometimes necessary to cauterize the limb three or four times.

Weir Mitchell has detailed at length his plan of treating sciatica by rest and cold.[1] "We rest," he says, "the body, even to using the bed-pan, absolutely imprisoning the leg, so as to ensure a nearly motionless rest. We use cold locally as needed, employ tonics and extra diet, general massage as far as available, and later also local massage. It is, as you observe, a modified rest treatment." In order to show the value of rest, he reminds us of the effect of slight movements of the body upon sciatic pain, coughing, laughing, or sneezing being sufficient to excite a paroxysm.

The plan of treatment, as described by Mitchell—and this plan is in general use at the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases—is to place the patient absolutely at rest, not allowing him to get out of bed for any purpose whatever. A long external splint is applied extending from the axilla to the heel. It is well padded, and held in position by bandages at several points in the course of the leg. It is best to have it made with a joint at the knee, so that the leg may be slightly flexed, and it is desirable to change the angle each time that the dressing is renewed. After a few days passive movements of the leg are made at the daily change of the splint, so as to avoid stiffness. It is important to support the ankle with a pad or small pillow, so that the heel does not bear the weight of the leg.

In cases of long standing dry cold is used by means of Chapman's ice-bags applied over the course of the nerve, and these are kept on day and night for several days. Instead of the ice-bag, there is sometimes used at the infirmary a tin case which is filled with ice. The upper surface is hollowed out, so as to receive the leg, which rests in it. The temperature is kept at about 59° F., but by adding salt to the ice in the case the temperature can be lowered still more.

After two or three weeks of the rest and cold treatment, if a cure has not been effected the Paquelin cautery is applied in the course of the nerve, and gentle massage is used after the healing of the blisters. The massage should be applied with great care, lightly rubbing the surface and stroking the limb in a downward direction. I have seen several cases of sciatica entirely relieved by the application of the

[1] *International Clinics*, April, 1891, p. 275.

long splint alone, without the use of cold or the application of the cautery.

Graeme Hammond[1] also advocates the use of rest, cold, and electricity. He also recommends the long splint from the axilla to the ankle, and cold by means of ice-bags along the course of the nerve. He advises, in addition, galvanism, by applying a large negative electrode over the sole of the foot and a large positive electrode over the gluteal region at the point of exit of the nerve, using as strong a current as the patient can bear.

Acupuncture is sometimes useful in cases of sciatica, and the German plan, known as Baunscheidismus, has enjoyed a reputation abroad for many years. It consists in driving through the skin a number of needles by means of an apparatus, and rubbing into the punctures oil of mustard or some other irritant. I have seen this plan result in benefit on more than one occasion. One patient who had suffered from sciatica for several years, and had obtained no relief from a number of different plans of treatment, was permanently cured by acupuncture. Aquapuncture—that is, the hypodermic injection of water into the seat of pain—is occasionally productive of relief, the relief sometimes lasting for several hours after the injection. The injection should be at the seats of most intense pain. These are usually at the sciatic notch, in the popliteal space, and just above the external malleolus.

A recent writer[2] has found greatly dilated veins in the interior of the sciatic nerves of persons with varicose veins. He has met with 11 cases of sciatica among 67 persons who suffered from varicose veins. He thinks the sciatica in these cases due to the dilated veins of the nerve, and has obtained excellent results by the application of elastic stockings.

The external use of sulphur has been very strongly recommended in sciatica of late years. The treatment consists in enveloping the whole leg in powdered sulphur during the night. Duchesne[3] states that he has seen a permanent cure of a case of sciatica by a single application of sulphur. Cowden[4] relates a case of severe sciatica which was cured by the application of sulphur two nights in succession. McNutt[5] reports the use of sulphur in 17 cases of chronic non-inflammatory sciatica, and in only 6 did it fail to give relief.

McKinn[6] reports a case of chronic sciatica in which hypodermic injections of antipyrine gave great relief. He injected from 15 to 25 grains at a time, inserting only 5 grains at any one place. The skin

[1] *Journal of Nervous and Mental Diseases*, May, 1890.
[2] *Annual of the Universal Medical Sciences*, 1889, vol. ii., B. 37.
[3] *Journal de Médecine de Paris*, Jan., 1888.
[4] *American Journal of the Medical Sciences*, July, 1888.
[5] *Medical News*, July, 1888.
[6] *N. Y. Medical Journal*, July, 1888.

in the neighborhood of the injection was made anæsthetic for from fifteen to twenty-four hours. The antipyrine was used in these cases dissolved in a little more than its own weight of water. Other writers have also spoken favorably of the use of antipyrine hypodermically in sciatica, and it has been found that the injections were more efficient the nearer they were given to the nerve-trunk.

Dana[1] speaks of the value of menthol internally in some cases of sciatica. He considers it an efficient and cheap substitute for antipyrine. He gives it in doses of from 5 to 20 grains.

Babinski and Brissaud have made a study of the attitude of patients suffering with sciatica. They describe a "sciatic scoliosis;" that is, a curvature of the spine with the convexity toward the affected side. There is frequently a compensatory curvature of the spine higher up. The leg is often slightly flexed and supported on the toe. This position is due to the effort which the patient makes to keep the weight off the affected leg. In the case described by Babinski the body was inclined toward the healthy side, and the foot of the painful leg was not lifted from the ground.

Guinom and Parmentier[2] describe a form of neuritis localized in the external popliteal nerve, and associated with degenerative atrophy of the muscles supplied by it, as a complication of sciatica. When this variety of neuritis occurs the case is likely to be protracted and a cure is difficult and often impossible.

## Other Forms of Neuralgia.

Among the other and less common varieties of neuralgia is cervico-occipital neuralgia. In this the pain is felt in the region supplied by the great occipital nerve, and is most marked in the terminal branches. I have seen two cases of very violent pain in this nerve which closely resembled meningitis. The pain was accompanied by rise of temperature, delirium, and considerable disturbance of general nutrition. When the pain is periodical, quinine is an efficient remedy, and antipyrine or phenacetin is useful in relieving the suffering of the patient.

The application of dry heat, and in severe cases the mild use of the Paquelin cautery over the nerve, are useful.

In cervico-brachial neuralgia the pain is usually felt just below the clavicle, in the arms, and sometimes in the breast. The most frequent painful points are a shoulder point just where the circumflex nerve pierces the deltoid, an axillary point, a point at the elbow where the ulnar nerve passes between the olecranon and epitrochlea, and another point at the lower end of the radius.

Neuralgia in this region is sometimes confounded with muscular rheumatism, but it may be associated with rheumatism of the deltoid.

[1] *Therapeutic Gazette.* [2] *Annual of the Univer. Medical Sciences*, 1890, C. 45.

The use of galvanism is advantageous, but sometimes the faradic brush or static electricity is better.

The arm should be kept at absolute rest while the pain continues severe. Sometimes sponging of the entire arm with hot salt water two or three times a day, and keeping it encased in silk or carded wool, will give temporary relief and often effect a cure.

Internally, salicylate of sodium or salol is of advantage, but as a rule local means are more effective than internal remedies. The general health of a patient suffering with a cervico-brachial neuralgia is usually at fault, and iron and cod-liver oil, with quinine and arsenic, will aid materially in the treatment of the case. These cases are sometimes very intractable, and result in wasting of the shoulder- and arm-muscles. The judicious use of massage will prevent atrophy and stiffness of the joints.

Intercostal neuralgia frequently simulates pleurisy, being sometimes accompanied by shortness of breath and pain on respiration. It is associated at times with an herpetic eruption in the course of the nerve-filaments, producing the so-called "shingles" or herpes zoster. The pain in herpes zoster sometimes precedes the eruption, but frequently it does not appear until after the vesicles are well formed.

Antipyrine and phenacetin are very useful in this form of neuralgia. An ointment containing cocaine or morphine will allay the burning pain when applied to the herpetic irritation.

Menard [1] considers that the cause should first be removed, and that counter-irritation should then be excited over the painful spot by means of a blister or iodine; or hot and cold douches should be applied. If anæmia exist, a course of baths with the internal administration of iron should be ordered. If due to rheumatism, the proper medicine for that disease should be administered. Venesection, he asserts, however, in the majority of cases gives excellent results. Another favorite mode of treatment is to apply iodine ointment directly to the walls of the chest, the clothing being protected by means of adhesive plasters.

Coccygodynia is a painful and obstinate neuralgic affection of the coccyx. It results from injury to the bone, either from a fall or blow, or is a result of labor. It may also occur without any direct injury. The pain is sometimes most severely felt when the patient is sitting, but in other cases it is most severe when rising from the sitting position, the pain being probably due to the action of the muscles attached to the coccyx.

A number of plans of treatment have been suggested for this painful malady—one being division, subcutaneously, of all of the tissues connected with the coccyx, and another being extirpation of the bone

[1] *Medical News*, Mar. 7, 1891.

itself. I have known one case of severe coccygodynia which was cured by the patient sitting only on a chair which had a large hole in the seat.

Plantar neuralgia is a rather rare affection, but it is occasionally met with, and may be associated with certain vaso-motor disturbances. Weir Mitchell first described this form of neuralgia plantaris, giving it the name erythromylalgia, and it has also been described by Ross.[1]

The pain usually begins in the ball of the great toe or the heel, often extends over a great part of the sole, and may reach the dorsum of the foot and the leg. It is felt at first toward night, and is relieved by the night's rest. It is increased by walking, the erect posture, or even by allowing the foot to hang down. The pain is at first of an aching character, but after a time it becomes burning, and is then aggravated by warmth and relieved by cold and the recumbent position. The characteristic feature of the disease, however, is flushing of the painful area, coming on with exertion or when the feet are allowed to hang down. In aggravated cases the pain is so severe as to make walking almost impossible, and when walking is persisted in intense redness and swelling are occasioned.

I recollect one case, a patient of Dr. Mitchell's, in whom the pain was so intense that the patient would go about the house on his hands and knees rather than bear his weight upon his foot. No treatment seems to be of any avail in this disease.

A neuralgic affection of the foot, first thoroughly described by Thomas G. Morton in the *American Journal of the Medical Sciences*, Jan., 1876, consists, according to E. H. Bradford,[2] of pain situated at the base of the fourth toe, and often in severe cases radiating up the leg. The character of the pain may be dull or throbbing and extremely severe. The pain is aggravated by pressure, but usually disappears at night. Nothing can be detected by inspection. The affection is not an uncommon one, and is found much more frequently in women than in men, and occurs in those who are accustomed to the luxuries of life. Bradford agrees with Morton that the symptoms are due to pinching of the metatarsal nerve, rather than to flattening of the tarsal arch. In the majority of cases Morton advises the excision of the head of the fourth metatarsal bone and of such portion of the shaft as will prevent pinching of the external plantar nerve.

The cases reported by Bradford were of the idiopathic subacute or chronic form, and did not require operative procedure. The treatment adopted was the prevention of any lateral pressure on the foot. The patients were advised to walk barefooted as much as possible, and to use substances such as the oleate of atropine or of morphine in order to relieve the sensitiveness of the skin. In severe cases crutches were

[1] *Diseases of the Nervous System*, vol. i. p. 571.

[2] *Boston Medical and Surgical Journal*, July 16, 1891.

used for a time. It is also wise to stimulate the circulation of the part by the alternate use of hot and cold water. Unusually broad-soled shoes are desirable. Unless a considerable period of time can be given to the following out of the instructions, operative interference is necessary.

Lumbar neuralgia includes all of the forms having their seat in the distribution of the first four lumbar nerves. It is unusual for the whole of the branch of the lumbar plexus to be implicated at once.

In lumbo-abdominal neuralgia there is pain in the loins extending as far as the sacrum and in front of the hypogastrium. It is very much like lumbago in its symptoms, but is different from myalgia in that the pain radiates in various directions, and is not aggravated by movement so much as lumbar myalgia is.

Hypodermic injections of atropine in this condition often give relief, and sedative applications of aconite and chloroform are also useful. Salicylate of sodium internally in full doses is of advantage, and in some cases small and frequently repeated doses of fluid extract of rhus toxicodendron afford speedy relief. Actea racemosa is also efficacious in some cases. I have seen a prompt cure from antipyrine.

Crural neuralgia is occasionally met with, but it is not so frequent as sciatica. The pain is located in the middle and inner part of the anterior surface of the thigh, the anterior surface of the knee, and the inner surface of the leg and foot as far as the great toe. The painful points to be remembered in crural neuralgia are one in the groin where the nerve emerges from the pelvis, one on the inner side of the patella where the saphenous nerve appears beneath the skin, one at the front of the ankle-joint, and one at the base of the great toe.

The treatment of this form of neuralgia is practically the same as that of sciatica.

In order to facilitate reference to the different drugs and remedial agents used in the treatment of headache and neuralgia, I have classified them alphabetically in the following list, giving, however, one column to treatment of headache and another to that of neuralgia. The main body of this table has been prepared from the works of Brunton, Bartholow, Gowers, Hare, Wood, and from Sajous' *Annual of the Universal Medical Sciences.*

The numbers refer to the following works:

1. Neale's *Medical Digest.*
2. Ringer's *Therapeutics.*
3. Bartholow's *Therapeutics.*
4. Wood's *Therapeutics.*
5. Brunton's *Therapeutics.*
6. Hare's *Practical Therapeutics.*
7. Sajous' *Annual of the Universal Medical Sciences.*
8. Gowers' *Diseases of the Nervous System.*

A number in parenthesis means that the author to whom the figure refers is responsible for the statement which precedes it:

| Remedy. | Headache. *Use, Dose, and Authority.* | Neuralgia. *Use, Dose, and Authority.* |
|---|---|---|
| Acetanilid. | Migraine and neurasthenic headache, 5-grain doses every hour until 15 grains have been taken. Caution in its use. | Useful especially with monobromated camphor (6). |
| Aconite. | When circulation is excited (5). In migraine, $\frac{1}{200}$ of a grain of aconitine every two hours. | Ointment of aconitine (5), 1, 2, 3, 4. Ointment (grains 2 to the drachm) or oleate of aconitine (grains 2 to sweet oil 100), useful when applied over painful spot, if limited in area; if not, contraindicated (6). Internally, $\frac{1}{200}$ grain for neuralgia of the fifth (Seguin). |
| Acupuncture. | | Needles dipped in oil of mustard and inserted over nerve, in sciatica. Nerve-stretching or neurectomy necessary in some cases (6), 1, 3. |
| Alcohol. | May do good at beginning, but often increases pain when headache has started (8), 2, 3, 4. Danger of habit being formed. | |
| Alum. | | Intestinal neuralgia (4). |
| Ammonia. | Aromatic spirit in $\frac{1}{2}$-drachm doses. Raspail's lotion locally very useful; often relieves nervous headache (5), 1, 2, 3, 4. | |
| Ammonium chloride. | 10- to 15-grain doses in hemicrania (5), 3. | In intercostal neuralgia (8), $\frac{1}{2}$-drachm doses (5), 1, 3, 4. In ovarian types (6). |
| Ammonium valerianate. | 1, 4. | |
| Anæsthetics. | In extreme pain, where narcotics have failed to give relief, 2. | |
| Aniline. | When pain is very severe (5). | Neuralgias of unknown cause. Alcoholic neuritis (Combemale, 7). Ehrlich and Leppman, 7. Dose of methyl blue, 1 to 2 grains three to four times a day, or hypodermically at seat of pain (7). |

| Remedy. | Headache. *Use, Dose, and Authority.* | Neuralgia. *Use, Dose, and Authority.* |
|---|---|---|
| Antacids. | Sick headaches, 4. | |
| Antipyrine. | Migraine and other headaches, 5 to 10 grains at a dose. Efficacy increased by addition of sodium bicarbonate, 4. | Very useful (6), 4. |
| Aperients. | Often of value in various forms of headache, 2. | |
| Apiol. | | Intermittent neuralgias (5). |
| Aromatics. | | Intermittent neuralgias (5). |
| Arsenic. | In brow-ague (5). Anæmic headache. | Many forms of neuralgia. |
| Asafœtida. | When much mental depression in migraine (8). | |
| Atropine. | Locally to the eye in migraine (5), 2, 3. | As liniment or hypodermically near the nerve (5), 1, 3. |
| Belladonna. | Frequently given in frontal headache, especially at menstrual period, or from fatigue (5). Valuable in young people (6), 1, 2, 3, 4. | |
| Bebeeru-bark. | (5). | Neuralgias of fifth nerve. |
| Bicarbonate of sodium. | With bitters before meals in frontal headache, or pain in upper part of forehead without constipation. As wash to the mouth when headache depends on decayed teeth (5), 5. | |
| Bleeding. | In congestive headaches. 1. | |
| Blisters. | 1, 4. | In sciatica. "Fly blisters" in neuralgia of fifth nerve. |
| Bromides. | In large doses (5), 3. With caffeine almost a specific (6). Especially useful in migraine, when there is no change in color of the face, or when the face is flushed throughout an attack (8). | |
| Bryonia. | In bilious headache (5). | |
| Butyl-chloral hydrate. | If due to eye-strain, 1, or associated with sick stomach (6). | For neuralgia of fifth nerve (5), 2, 3, 4, 6. |
| Caffeine or caffeine citrate. | In nervous headache (6), 1. Hemicrania. | Combined with sodium salicylate in neuralgia of fifth nerve. |
| Cajeput oil. | Locally (5). | |
| Camphor. | Internally, and saturated solution externally (5), 3. | |

| Remedy. | Headache. *Use, Dose, and Authority.* | Neuralgia. *Use, Dose, and Authority.* |
|---|---|---|
| Camphor liniment. | Locally to relieve pain (6). | |
| Cannabis indica. | Migraine. In neuralgic headache (5), 1, 3, 4. | Tic-douloureux. |
| Capsicum plaster. | To nape of neck (6). | Locally (5), 3. |
| Carbon disulphide. | Locally for congestive headache, 1. | Locally for trigeminal neuralgia. |
| Carbonic acid. | | Locally for neuralgia, 3. |
| Cascara sagrada. | Nervous and bilious headaches (I. V. Stevens). | |
| Cautery. | | Of great use, especially in sciatica (5), 1. |
| Chloral and camphor. Form a liquid. | | Equal parts locally applied (5), 2, 3, 4. |
| Chloralamid. | Migraine and neurasthenic headache, grains 20 to 45, 6. | |
| Chlorate of potassium. | | In facial neuralgia (5), 3. |
| Chloroform. | Spirit of, in nervous headache (5). | Locally and by inhalation, when pain very severe (5), 1, 2, 3, 4. |
| Chloroform liniment. | | A local anæsthetic (6). |
| Cimicifuga. | In nervous and rheumatic headache, especially at menstrual period (5), 3. If due to eye-strain (6). | Especially useful in ovarian types (6). In neuralgia of fifth nerve and ovarian neuralgia (5), 2. |
| Cinchonidine salicylate. | | 3–5 grains every two hours. |
| Cocaine. | In neurasthenic headache, 3. | By anodal diffusion for neuralgia of superficial nerves. |
| Codeine. | Often preferable to morphine, 1. | |
| Cod-liver oil. | In headaches from debility and anæmia, 2, 4, 6, 8. | In sciatica, tic-douloureux, and neuralgias of old and feeble persons. |
| Colchicum. | For gouty headaches, 1. | |
| Cold affusion. | Congestive headache, 3. | |
| Copper, amoniosulphate. | | Grain $\frac{1}{16}$ to $\frac{1}{12}$ after food, in neuralgia of the fifth. |
| Counter - irritation. | Over seat of pain, 3. | Over course of nerve. |
| Creasote. | | Neuralgia of fifth, 1, 5. |
| Cupping. | To nape of neck in congestion (6). | |
| Diet. | Often of the greatest importance (8). | |
| Digitalin. | Grain $\frac{1}{60}$ twice a day for congestive hemicrania (5), 2. | |

| Remedy. | Headache. *Use, Dose, and Authority.* | Neuralgia. *Use, Dose, and Authority.* |
|---|---|---|
| Diuretics. | Of value in toxæmic headaches (8), 1. | |
| Effervescing preparations. | Such as antipyrine with salicylic acid and caffeine, or sodium bromide with caffeine. | |
| Electricity. | Faradism usually does harm in migraine (8), 1, 1, 4. Galvanism useful, 2. | Galvanism and static electricity for sciatica and trigeminal neuralgia. |
| Ergot or ergotin. | If due to congestion (6), 2, 4. | In visceral neuralgia (5), 3, 4. |
| Ether. | Inhalations in severe migraine. (See text.) 1, 3, 4. | |
| Ether spray. | Locally for frontal headaches after illness or fatigue (5), 3. | To the seat of pain. |
| Ethyl chloride. | | Local application in temporal neuralgia. (Grandeclément, 7). |
| Eucalyptus. | In migraine (De Schweinitz and Lewis), 6. | |
| Exalgin. | English writers consider it dangerous. May be used with caution; 2 to 4 grains, for neuralgic headache. | Facial neuralgia, herpes zoster (Gorodichze, 7). |
| Exercise. | Often useful. | Often of service. |
| Freezing. | | Freezing parts with ether or rhigoline spray, or by similar action of ice and salt, is successful if nerve is superficial (6). |
| Gelsemium. | If due to nervous troubles or eye-strain (6), 2, 3, 4. | In trigeminal neuralgia, especially if connected with decayed teeth. In sciatica. |
| Gold chloride. | 1. | |
| Guarana. | Migraine and nervous headache. (See text.) With salicylate of sodium. | |
| Hot applications. | As hot water or poultice to nape of neck (5). In migraine or anæmic headache, 3. | |
| Hydrastis or hydrastinine. | In congestive headache with constipation (5). | |
| Hydrobromic acid. | If due to eye-strain in nervous women (6). Also, in congestive headaches. | |
| Hydrocyanic acid. | | Useful in intestinal neuralgia (6), 3. |

| Remedy. | Headache. *Use, Dose, and Authority.* | Neuralgia. *Use, Dose, and Authority.* |
|---|---|---|
| Hygiene. | Of the greatest importance in all forms of headache. | In all forms of neuralgia. |
| Hypnotism. | Various forms of headache (Moll, 7). French writers approve its use. | Intercostal neuralgia (Bramwell, 7). Facial neuralgia (Eastlake, 7). Schmid, 7. Luys, 7. French writers praise its use. |
| Ice-bag. | Applied to head or leeches behind ears in severe cases (6). Congestive headache. | In sciatica (W. Mitchell). |
| Ignatia. | In hysterical headache (5). | In hysterical cases and in intercostal neuralgia (5). |
| Iodides. | Useful in organic headaches and those of syphilitic origin. In rheumatic headache with tenderness of scalp (5). | May be tried in rheumatic neuralgia (6). Useful in syphilitic forms (8), especially when nocturnal (5), 1. |
| Iodoform. | | Has been found useful in sciatica. |
| Iris. | In supraorbital headache with nausea (5). | |
| Iron. | In anæmic and neurasthenic headache. | Arsenic and iron should be given when patient is anæmic; often necessary to associate with cod-liver oil (6), 2, 3. |
| Kataphoresis. | 6. | In neuralgia of fifth nerve and sciatica (Corning, Peterson, and others). |
| Liquor magnesii citratis. | In sick headache (6). | |
| Magnesium carbonate. | Grains 5 to 60 in sick headache due to gastric acidity (6). | |
| Magnesium sulphate. | For frontal headache with constipation, 4. | |
| Massage. | In migraine and congestive headaches. Also of value in general treatment of neurasthenic cases. | In sciatica and other neuralgias "*effleurage*" should be employed. |
| Menthol. | As local application (5), 1. | Locally for supraorbital neuralgia, sciatica, and neuralgia of other superficial nerves. |
| Mercury. | In bilious headache (3). Bichloride, $\frac{1}{100}$ grain every two hours in syphilitic headache. | |
| Methyl blue. See *Aniline.* | | |

| Remedy. | Headache. *Use, Dose, and Authority.* | Neuralgia. *Use, Dose, and Authority.* |
|---|---|---|
| Morphine. | Hypodermically in migraine or other severe head-pains, 1. | Grain $\frac{1}{5}$ to $\frac{1}{4}$ injected into painful spot if localized; not advisable in chronic cases (6). Hypodermically (5), 1, 2, 3. |
| Mustard. | As foot-bath or poultice to nape of neck (5), 3, in congestive and migraine. | As a counter-irritant (6), 5. |
| Nickel bromide. | In hemicrania (DaCosta), 1. | |
| Nitrite of amyl. | In anæmic headache. As an inhalation when face is pale (5), 1, 2. | |
| Nitrogen monoxide. | In migraine and anæmic headache (Birdsall and Hamilton). | |
| Nitro-glycerin. | In anæmic headache and migraine. Commence with small dose, $\frac{1}{150}$ to $\frac{1}{200}$ grain. May be combined with tincture of nux vomica, tincture of gelsemium, and dilute phosphoric acid, or with bismuth (2), 1, 2, 4. | |
| Nitro-hydrochloric acid. | For pain just above eyeballs without constipation, also for pain at back of neck (5). In lithæmic headache. | |
| Nux vomica. | Frequently repeated in nervous or bilious headache (5), 1 drop every five or ten minutes until 10 drops have been taken. | In visceral neuralgia (5). Or strychnine, if nerve is depressed by anæmia (6). |
| Oil of cloves. | | Locally (5) in superficial neuralgia. |
| Opium. | Recommended by Day and others in congested forms of headache during paroxysms, 3. | |
| Oxygen. | In anæmic headache (Hamilton). (J. H. de Wolf, 7.) | |
| Peppermint. | | Oil locally applied on cloth over painful spot (6). |
| Phenacetin. | If due to eye-strain (6), combined with salol for rheumatic headache. Very useful in migraine, grains 3 to 8 every two hours. | |

| Remedy. | Headache. *Use, Dose, and Authority.* | Neuralgia. *Use, Dose, and Authority.* |
|---|---|---|
| Phenyl urethane (euphorin) | Hemicrania, 3 to 6 grains three to five times daily (F. Adler, 7). | Supraorbital neuralgia, sciatica (F. Adler, 7). |
| Phosphorus. | | If due to nervous exhaustion (6), 1, 2, 3, 4, $\frac{1}{50}$ to $\frac{1}{30}$ grain. Often fails, but at times good (8). |
| Picrotoxin. | In periodical headache (5), 2. | |
| Podophyllin. | Bilious headache, when constipation (5), 2. | |
| Potassium cyanide. | As local application (5), 2. | |
| Pyrethrum. | | As masticatory (5). |
| Quinine. | 5. | In periodical cases (5), 3, 4. Great importance in sciatica. |
| Rest. | | In sciatica and other neuralgias (Mitchell). |
| Rest cure. | Anæmic and neurasthenic headache, hemicrania. | Very useful in exhausted patients (6). |
| Rubefacients. | To seat of pain and nape of neck. | Neuralgic pains relieved by (5). |
| Salicin. | Rheumatic headaches, 1. | |
| Salicylate of sodium. | 3-grain dose every hour exceedingly useful (5) in rheumatic headache and migraine, 1, 3. | Sciatica, 15 grains three or four times a day. Trifacial neuralgia. |
| Sanguinaria. | In gastric derangement (5). | |
| Sodium phosphate. | As laxative in bilious headache (5), 2, and migraine. | |
| Spectacles. | For headache due to eye-strain. | |
| Spinal ice-bag. | Neurasthenic headache, 3. | |
| Strychnine or nux vomica. | If due to eye-strain (6), 1, 2. | |
| Sumbul. | In nervous headache. | Sometimes very useful (5). |
| Tea. | Strong, black or green, often relieves nervous headache quickly (5), 3. | |
| Tonga. | 1. | Neuralgia of fifth. |
| Turkish bath. | Congestive headache and headache after debauch. | May relieve if due to rheumatism or gout (6). |
| Turpentine. | 1, 2. | Locally for sciatica. |
| Valerian. | In nervous or hysterical cases (5). In migraine when much depression (Latham, quoted by 8). | 5. |
| Veratrine. | | Ointment locally applied over neuralgic nerve (6), 2, 3, 4. |

| Remedy. | Headache. *Use, Dose, and Authority.* | Neuralgia. *Use, Dose, and Authority.* |
|---|---|---|
| Vibration. | 5. | In sciatica (Granville Mortimer). |
| Warmth. | Wise to keep extremities warm, 8. | |

# NERVOUS DISORDERS AND PARALYSES FROM EXCESSIVE USE OF THE PARTS AFFECTED; VERTIGO, TREMOR, AND LEAD-POISONING.

By C. EUGENE RIGGS, A. M., M. D.

## NERVOUS DISORDERS FROM EXCESSIVE USE OF THE PARTS AFFECTED.

The term occupational neurosis is applied to a certain class of nervous disorders, mainly functional in nature, which are made manifest by peculiar disturbances of motion in certain groups of muscles on being brought into action, the action being one continually repeated and usually involved in the occupation of the patient. The typical features of this class of troubles are spasm, inco-ordination, and paresis in the group of affected muscles, with sensory and vaso-motor disturbances here and in contiguous parts. Symptoms of general nervous irritability are usually present.

Any occupation which calls for the excessive use of one group of muscles may give rise to these disorders, but those in which the smaller and more finely co-ordinated muscular groups are brought into action furnish the larger percentage of cases. The persons most likely to be attacked by these cramps are writers, telegraphers, and musicians, but cases have been reported among milkers, tailors, seamstresses, shoemakers, blacksmiths, carpenters, dancers, photographers, watchmakers, cigarmakers, auctioneers, elocutionists, swimmers, sawyers, bicyclists, drummers, treadlers, turners, fencers, and makers of artificial flowers. Poore mentions a typesetter who could no longer hold the stick in his left hand, a pickle-jar tier who had lost the power of grasping the top of the jar with his left hand, and a bricklayer who could not use the trowel. The prolonged driving of spirited horses has been known to produce disorder of this sort. Miner's nystagmus is also classed under the same head.

Although a case apparently of writer's cramp was reported by Ramazini in 1746, yet these occupational disorders may safely be called a nineteenth-century disease. Writer's cramp, the classical

type of such troubles, was first described by Sir Charles Bell in 1830.

The nervous diathesis is often marked in this class of patients, although at times the sufferers show no signs of neuropathic tendency. All authors state that the family history frequently shows a record of some nervous malady, such as chorea, mental instability, or epilepsy. The abuse of tobacco or alcohol, anxiety, and excessive emotion predispose to the affection. It sometimes follows local injury (Gowers). Writer's cramp has been said to occur more often in those who use steel pens, because of the additional friction in propelling them across the paper as compared with pencils, quills, or gold pens. The method of holding the pen and the manner of writing have much to do with the production of the disease. Those who write a free hand, writing from the forearm or from the shoulder, seldom suffer from it. A cramped mode of writing where the pen is moved by the motion of the thumb and first two fingers, or even from the wrist, predisposes to it, while tight sleeves, hard-pointed pens, bad position, and inconvenient tables may all be elements in its production.

Telegraphy produces a large number of cases of occupational spasm. "Investigation seems to prove that a very large number of telegraphers, if not the majority, sooner or later show some symptoms of copodyscinesia."[1]

In some cases writer's cramp comes on suddenly, but as a rule the approach of the trouble is gradual. The first symptom noticed is usually merely slight stiffness and difficulty of motion, with a sense of fatigue in the arm and hand. Presently spasms, either tonic or clonic in character, but usually the former, appear. They may affect either the extensors or flexors, the latter being of more common occurrence. The pen may be moved inward away from the paper by a coincident contraction of the thumb and index finger; the first finger and thumb may become flexed at all joints, allowing the pen to slip out; the pen may be pressed against the paper by a contraction of the first three fingers; or there may be a spasm of the extensors, the fingers extending abruptly and dropping the pen. There may be spasm of the shoulder or forearm muscles, causing irregular movements of the pen. In telegrapher's cramp the spasm of the extensors is of more frequent occurrence than flexor spasm. Telegraph operators who experience the most difficulty in transmitting usually have a cramp of the extensors, and those having the most difficulty in receiving usually have a cramp of the flexors, though the reverse is occasionally seen. The spasms may be slight at first, gradually becoming stronger. In some instances they amount almost to tetany. Mitchell reports meet-

[1] Pepper's *System of Medicine*, vol. v. p. 508, "Neural Disorders of Writers and Artisans," Lewis.

ing in this affection with a "lock-spasm," in which the hand or fingers become locked in a stronger contraction than the patient could voluntarily produce. This form of spasm, however, is not confined to the neuroses which we are considering, but may be simulated by hysteria. I have met with a curious case of "lock-finger" in a hysterical patient, the middle finger of the right hand contracting in so strong a spasm that it was impossible to pry it open without breaking the finger, and remaining in this condition for five minutes at a time.

Paresis, or even paralysis, of the muscles of the hand and arm may occur in writer's cramp, with accompanying pain and fatigue; this form of the affection may be the only one manifest, or it may follow spasm, or there may be paresis of certain muscles and spasm of others not their opponents, the paretic muscle being the first affected (Lewis). These cases are not as frequent as the spasmodic form. A still rarer form is the tremulous. A rapid tremor of short oscillation is noticed when the hands are employed in writing, ceasing with the effort to write. The fingers, especially the thumb and forefinger, are most usually attacked, but there may be oscillatory trembling of the hand and forearm, or even of the upper arm.

"Miner's nystagmus," which falls under this type, is thought to be due to the irregular action of the ocular muscles as the eye follows the flickering light of candles and lamps. A curious case of this sort is reported by Dr. J. A. Smith:[1] The miner's sight completely left him when at work, but when he ceased working it returned; when he took his working position (on the left side with left leg doubled under him), even in broad daylight, there was noticeable slight oscillation of the eyes.

The electrical irritability of both nerves and muscles in these disorders may be normal, or there may be a slight increase or diminution, usually in cases that have existed for some length of time. The change when it exists is usually the same to both currents, and the same in the muscles as the nerves.

Both sensory and vaso-motor symptoms may occur in connection with any of the preceding types of professional cramps. The former are usually present, a sense of fatigue in the hand or arm being one of the first symptoms. Among the sensory manifestations noted are lameness, aching, pain, prickling, numbness, tenderness to touch in various points (in writer's cramp especially in the region of distribution of the radial nerve). Occasionally the pain is severe, and so associated with the course of the nerve as to mark it as distinctly neuralgic. There may be a sense of heat in the shoulders or cervical or upper or dorsal spine, a feeling of weight in the hand or arm, sensation of constriction around the wrist, throbbing and pulsation or tense feeling of skin.

[1] *British Medical Journal*, Aug. 29, 1891.

Vaso-motor disturbances are much more rare. "When a patient with this symptom attempts to perform the task which produced the disability, in addition to the fatigue, pain, or spasm the veins on the back of the hand or fingers will be seen slowly to enlarge: this may gradually increase until it extends over the whole arm, the parts becoming more or less turgid with blood, the temperature at the same time being somewhat increased. A marked sensation of throbbing accompanies these symptoms" (Lewis). I have under my care a case of treadler's cramp in which the sensory and vaso-motor symptoms are peculiarly marked. The patient is a hub-mortiser, a young man with a history of nervous heredity, but in robust health before the trouble came on. Two years ago he first noticed pain in the ball of his right foot and in the toes when the movements peculiar to his occupation were made: any other form of motion did not cause pain. About three months after the pain in his foot appeared he commenced to have pain in the right hip; the pain is dull and heavy in character. At present any attempt to perform the muscular actions common in his occupation or any motion of the limbs, as in walking, is attended with severe pain. This is especially noticed in flexion of the hip. Going down stairs is much less painful than ascending. The pain is attended with spasm of the hip muscles. For the past three months he has been unable to bear the weight of his body on the ball of the foot, which is swollen much of the time: its condition has been such that operation upon it was advised by a surgeon whom he consulted. Flexion of the toes of the right foot is very painful; extension but slightly so. At night he has to lie on the affected side if he wishes to sleep. The superficial and deep reflexes are exaggerated, and there is marked fibrillary twitching of the muscles of the outer and posterior aspect of the right thigh. The electrical reactions are normal, a little less pronounced on the right side. The disease came on after two years of this special work.

Dr. W. H. R. Rivers[1] publishes an account of a case of treadler's cramp very similar to this, except that the vaso-motor and sensory disturbances so marked in the instance I have just given seem to have been absent.

There are different theories as to the pathology of writer's cramp and similar neuroses. It has been supposed that the pathological changes are purely peripheral in character; that the neurosis is a "perversion of the muscle sense;" that the disease is purely central in character; that there are two distinct classes of occupational neuroses, one being central and one peripheral in origin; and that the disease "is at first peripheral, but by abuse may become central (spinal)."

While other causes may be adjuvant, the burden of evidence and

[1] *Brain*, 1891.

authority points to a central origin for the difficulty. Says Dr. Ross:[1] "Professional cramps are doubtless caused by functional or molecular lesion of some part of the nervous mechanism which regulates the actions of the muscles executing the movements which are disordered. It is very likely that professional cramps are sometimes caused, as cramp of the calf, by irritation of the intramuscular nerve-endings or the end-plates in the muscular fibres. It is possible that at other times the seat of the lesion is the mechanism of cells and fibres in the anterior gray horns of the spinal cord, which regulates the movements in writing, while in still other cases the lesion is probably situated in the cortical centres or in the course of the centrifugal conducting paths which connect it with the spinal cord."

Dr. Dana[2] inclines to think that the muscular sense is not involved, but agrees with Ross as to the seat of the disease being in the spinal cell-groups of the anterior horns and in the cerebral centres in the cortex.

The clearest and most convincing theoretical explanation of the probable nervous mechanism of the phenomena of professional neuroses on the theory of their central origin is given by Gowers, who says that the movements affected by occupational neuroses are of the purely acquired order, and acquired movements are brought about by the previous "education" of the nerve-centres concerned in them. This development is the result of persistent functional activity under volitional stimulus, which must be strong at first, but weakens as the habit of associated action in those cells is established. Nutritional changes as the result of a constant functional activity give a healthy physiological perpetuity to such associated nervous activities. "The clearest conception we can form of the pathology of writer's cramp is that this process of lowering of resistance between nerve-cells has gone too far, so that the energy evolved is excessive and irregular, although when the same cells are excited in a different order the resistance is normal in proportion as the order differs from that involved in the act of writing, and hence in that degree other movements escape. No doubt the impairment of function is attended by impairment of nutrition. In some cases the changes go so far that all attempts at movement give rise to cramps, and at the same time the total power that can be excited is considerably below the normal. The mechanism of the morbid lowering of resistance may be the same as that by which the resistance is lowered in the education of the cells, carried in this case to excess."[3] Gowers differs from most other writers in regarding as questionable the causal relation of neuritis in the production of this disease.

[1] *Diseases of the Nervous System*, p. 346.

[2] "Professional Neuroses," *Reference Handbook of the Medical Sciences*, vol. vi.

[3] Gowers, *Diseases of the Nervous System*, p. 1070.

Summing the matter up, Erb says: "We are still very much in the dark with regard to the real nature of these forms of disease. They undoubtedly present intimate relations to neurasthenia, and are probably due to a localized irritable weakness of certain parts of the nervous system caused by over-exertion. This is situated mainly in the central nervous system, though we are ignorant as to its location in the spinal cord, the basal ganglia, or cortex of the brain; nor is the implication of the peripheral apparatus, the nerves, and muscles excluded with certainty."

The history of the case of any professional neurosis, with attention to the symptoms as they manifest themselves, will usually render the case entirely clear. The fact that the spasm, pain, or tremor as a rule occurs only when the patient is engaged in his special occupation is usually sufficient for diagnosis. While the onset of such other diseases as paralysis of the musculo-spiral nerve, insular sclerosis, hemiplegia, and paralysis agitans may first be noticed in connection with the act of writing, the fact that the symptoms to which they give rise are not, even at the beginning of the trouble, limited to the act of writing, is sufficient to prevent confusion. Care must be used to distinguish the professional muscular atrophy of Onimus from progressive muscular atrophy. According to Dana,[1] the former are "myopathic in origin, and are not accompanied with the central, vaso-motor, or secretory disturbances of the true spinal progressive muscular atrophy, and they are characterized by a rapid improvement or arrest from progress under rest and treatment."

Unless the patient can stop work for at least six months or a year early in the course of the disease, treatment is usually of little avail and the probability of recovery extremely doubtful. Prevention is easier than cure in these affections. Local fatigue and slight cramps demand immediate attention. In writers the use of stylographic pens is less likely to bring on trouble than any other kind, as there is less prehensile power exerted in grasping them; the same is true to a less extent of gold pens. Smooth paper and a properly-arranged desk are also useful adjuvants in preventing the trouble. Aside from varying the form of penholder or the manner in which it is usually held, the hand which is affected may be given rest and the other educated to take its place. The value of the latter proceeding is debated, some authorities averring that the other hand will speedily become affected in the same way. On the contrary, Gowers advises the use of the other hand, and quotes the case of a government clerk who used his left hand for twelve years, during which time, though the cramp continued in the right, the left showed no signs of involvement. According to the same writer, all prothetic apparatus is worse than useless and

[1] *Op. cit.*

should not be recommended, as it "staves off the impending disability, while the malady is really getting worse, and thus increases the difficulty of treatment." The use of a typewriter offers means of resting the affected muscle in many cases without a cessation of work. Where neuralgic symptoms are very marked, however, the machine cannot be used.

Contrary to the prevailing opinion of the laity, the employment of such exercises as rowing, riding, etc., does not ward off or relieve the disease. Systematic massage of the affected muscles has resulted in great benefit to this class of patients, particularly if the method employed by Wolff, which is really a combination of exercise and massage, be followed out: "For the cure of this disease I employ, as is already known, massage and gymnastic exercises, both of which, in addition to the material and mechanical influence which they exercise on the various nerves and muscles, have the far more important and essential object of acting on the psychically affected centres—that is, upon the morbidly affected will of the patient—and thereby moderate the action, or rather, by drawing the attention from the affected point, influence some new action of the mind. This is my real secret: the most untiring and intelligent practice and an exact knowledge of the ailment of the patient are required in order that the best material and moral effects may be attained by directing the attention and comprehensive powers of the patient to a neutral field. . . . . I endeavor, by active or passive, special or general movements as the case may require, to strengthen the muscle, above all things trying to stimulate gradually the usual morbid movements to a different action by means of involuntary contrary movements suitable to the case and the patient, continuing this treatment until the patient, without knowing it and almost without intending it, habituates himself quite mechanically to the passive regular movements I have taught him to execute. . . . . There being, as already observed, only certain groups of muscles and certain nerves involved, which can be exactly determined by special movements, particular attention must be paid to the treatment of these, and as soon as the patient is able to effect the prescribed movements with the hand, arm, or foot readily, freely, and regularly he is in a fair way to speedy recovery."[1]

The general health should be carefully looked after, and as far as possible all debilitating influences avoided. Such reconstructives and tonics as iron, quinine, and strychnine, malt and cod-liver oil, may at time be used to advantage.

Atropine and strychnine, morphine, arsenic, and duboisine have been used hypodermically with varying results. In the associated spasms of such muscles as the sterno-cleido-mastoid the injection of

[1] Julius Wolff, *British Medical Journal*, July 19, 1890.

atropine, after the manner of Dr. Leszynsky in a case of tonico-clonic spasm, is worthy of trial. He advises beginning with $\frac{1}{120}$ grain, and gradually increasing the dose from day to day until the desired effect is produced or tolerance is established. The injection should be made into the substance of the muscle, where it is slowly absorbed and acts locally upon the intramuscular nerve-elements.

When the neuralgic symptoms are prominent, the use of counter-irritation by blisters, or preferably by the actual cautery over the tender points, proves highly beneficial. Such sedatives as Indian hemp and morphine, along with inunctions of aconite ointment, extract of belladonna, and glycerin, are serviceable (Gowers). Tenotomy and nerve-stretching have been tried, but are not admissible. Hammond advises bromide of zinc used in gradually increasing doses in the incipient stages, saying that in conjunction with rest it often effects a cure. The use of alternate hot- and cold-water douches to the affected part is reported as having given much relief.

Electricity has proved itself of great value in the treatment of this class of neural disorders: its various forms have been, in my experience, useful in the order following: faradic, static, galvanic, the least useful being the faradic. Faradization usually proves disappointing. Its use is indicated only in the paralytic and the rare form of the disease known as professional muscular atrophy. In the spasmodic form it is not only valueless, but is positively harmful.

I have seen unquestioned benefit derived from insulation followed by very heavy sparks drawn from the affected member: the relief of pain following this form of treatment has been very marked, while in patients who are neurasthenic and greatly debilitated the tonic effects of general franklinization are decided. By far the most beneficial manner in which electricity can be applied in professional hyperkineses is by the constant current. According to Erb, the application should be made to the entire motor apparatus from the cerebral cortex to the muscles. According to the same author, transverse, longitudinal, and oblique applications should be made to the head. "Then treatment of the cervical sympathetic, and especially of the cervical cord, by various methods according to the character of the case (either ascending stable, so that the cathode acts chiefly on the cervical cord, or stable application of the anode, as recommended in other forms of spasm). Finally, peripheral galvanization of the nerves and muscles (either more labile in the tremor-like and paralytic forms, or mainly with stable currents, as in the spastic form). Relatively weak currents should always be employed in order to avoid exhaustion of the motor apparatus."[1]

Very beneficial results follow from the treatment of points of pres-

[1] Erb, *Handbook of Electro-therapeutics*, p. 296.

sure upon the spinal column, the brachial plexus, etc. Poore suggests that gymnastics be combined with the galvanic applications.

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## VERTIGO.

VERTIGO is a symptom common to many diseases, and hence may arise from many different conditions. Gowers defines vertigo as "any movement or sense of movement, either in the individual himself or in external objects, that involves a defect, real or seeming, in the equilibration of the body." This defect of equilibration manifests itself in different directions: the apparent movement either of the person or of the objects immediately surrounding him (*i. e.* the movement is either subjective or objective) is variable in direction, as horizontal, vertical, oscillatory, or gyratory.

Vertigo is of so distressing a nature to the patient that it is often magnified to such an extent as to raise it to the dignity of a disease, and it has come to be so regarded, not only by the patient, but by some authorities who discuss the subject. Clinically, however, it is fundamentally a symptom, and as such I shall regard and discuss it.

Vertigo may or may not be attended by mental confusion or loss of consciousness, since the loss of consciousness is only a measure of the severity of the attack. It is further characterized by a feeling of anguish or terror which is persistent. Other symptoms which may or may not be present are buzzing in the ears, mist or flashes of light before the eyes, nausea and vomiting, looseness of the bowels, and at times a flow of pale urine. The mental confusion, if present, may take the form of an hallucination: Trousseau describes a case of this character in which it seemed to the patient that the earth was opening in front of her; her legs bent, and she felt as if she were being irresistibly borne toward an open abyss which she believed she saw at her feet.[1]

Grasset characterizes as a vertigo Romberg's symptom of tabes, which consists of a loss of equilibrium on closing the eyes. In my classification of vertigoes I shall follow, with some modifications, that of Grasset. He distinguishes two great categories: first, acute or accidental; second, chronic or habitual vertigoes. Under the first head would fall every vertigo that occurs but once or is repeated but a few times, "whose immediate and exterior cause is easy to comprehend, and which disappears on the removal of the cause." Among these vertigoes are those attending the onset of acute infectious diseases, inflammations, influenzas, and the vertigo which accompanies the stage of excitation

[1] Trousseau's *Clinical Medicine*, vol. xi. p. 356.

in cerebro-spinal meningitis; those of passing attacks of indigestion, of acute alcoholism, and of the first cigar; the dizziness attendant upon looking down from a great height or over a vast expanse; that of swings, the waltz, and sea-sickness. There are also many toxic vertigoes, such as are produced by digitalis, sulphate of quinine, salicylate of sodium, anæsthetics, hemp, opium, belladonna, and gelsemium. To the accidental vertigoes belong also those caused by heat, by the suppression of habitual discharges, as hæmorrhoids and the menstrual flow, by the rapid cure of cutaneous diseases, and by irritation of the urethra, such as follows the introduction of a bougie. Here also belongs nocturnal vertigo, the vertigo arising from transient irritations of the outer ear, such as the injection of hot or cold water, the pressure of wax or other accumulations on the drumhead, the presence of foreign bodies, or inflammation; that occasioned by nasal obstruction and post-nasal catarrh and by "affections of nerve-trunks, nerve-wounds, and sudden freezing of the nerve."[1]

Vertigo may be occasioned by sexual excesses, mental strain, and profound emotional disturbances; also by the passage of a strong galvanic current through the brain, especially if it be passed transversely through the head, or by the impulsion of air or fluids through the Eustachian tube into the tympanic cavity.

Brown-Séquard has concluded that irritation of every sensory nerve may by reflex action produce convulsions, vertigo, and other symptoms of encephalic disturbances.

Under the head of chronic vertigoes Grasset makes four grand divisions: first, epileptic vertigo; second, sensorial vertigo, particularly auricular vertigo; third, stomachic vertigo; fourth, cardio-vascular vertigo or the vertigo of arterio-sclerosis.[2]

I should add somewhat to this strict classification, as well as modify it, by introducing a cross-classification of certain vertigoes. There are, for example, certain toxic vertigoes which are not strictly acute or accidental in their origin; such are the vertigoes of miasma, of chronic plumbism, of lithæmia, and that vertigo in Bright's disease not arising from the precedent arterio-sclerotic trouble, but from the direct action of the toxic element (urea) in the blood acting upon the cerebral centres.

Again, vertigo is seen at the inception of some spinal maladies, notably posterior sclerosis, and, according to Charcot, it marks the period of invasion of about three-fourths of all the cases of disseminated sclerosis of the nervous centres; it is usually gyratory in character. "All objects seem to be whirling around with great rapidity,

[1] S. Weir Mitchell, Pepper's *System of Medicine*, vol. v. p. 420.

[2] *Du Vertige cardio-vasculaire, ou Vertige des Arterio-sclereux*, par le Professeur J. Grasset.

and the individual himself feels as if revolving on his axis."[1] Severe vertigo, sometimes amounting to a typical epileptiform attack, accompanies bulbar hæmorrhage, and is usually present in compression of the medulla. It is well known that vertigo is associated with almost every acute and chronic affection of the brain, and may therefore arise from abscesses of the brain and from brain tumor. It is very common in lesions of the cerebellum and of the pons, "especially at the side of the pons involving the middle peduncle of the cerebellum: a lesion here sometimes causes not only a sensation of turning, but actual rotation."[2]

Vertigo with tinnitus may accompany cerebral anæmia or allied disorders, such as leukæmia and chlorosis, also hyperæmia and the hysteroid and neurasthenic states. Vertigo in cerebral affections is joined to an almost constantly present sense of uncertainty in movement, to headache and other signs of encephalic malady; it is usually objective in character, and, unlike the vertigo observed in mere sympathetic disturbances of the brain, is relieved by closing the eyes (DaCosta). Vertigo is also associated with a fatty heart and dilatation of the right cavity.[3]

I am inclined to regard the "essential vertigoes" of Ramskill and Mitchell as arterio-sclerotic in their origin.

The second group, of chronic or habitual vertigoes, comprehends, from the point of view of the duration or repetition of the attacks—first, the constant vertigo, which is rare; second, the prolonged vertigo or vertiginous state (the "status vertiginosus" of Mitchell), in the course of which the patient for days or weeks together cannot turn or or move in any fashion without being seized with the agonizing sensation: third, the frequent vertigo, whose attacks, often repeated, renew themselves without apparent exterior cause (Grasset).

The pathology of vertigo is yet to be written. There are different theories, as that the direct cause of all vertigo is a disordered cerebral circulation (Ramskill); that it may be due in all cases to a disturbance of the central nerve-ganglia; and that the attendant basal condition is but one incident in the attack (Mitchell). It is believed that the cerebellum is the centre for the co-ordination of movement. Lesions and injuries here are followed by the phenomena of motor disturbances whose amount and permanence depend upon the extent and location of the injury. Injury to the middle lobe especially is followed by pronounced vertigo.

Physiologists have found that in animals rolling and forced movements can be produced by injuries of the cerebral cortex, especially in

[1] Charcot on the *Nervous System*, p. 159.

[2] Gowers, *Diseases of the Nervous System*, p. 531.

[3] Bartholow, *Practice of Medicine*, "Vertigo," p. 583.

the parietal lobe, the corpora striata, the optic thalami, cerebral peduncles, pons Varolii, corpora quadrigemina, cerebellar peduncles, and olivary bodies.[1]

Dr. Dana in the article just referred to calls attention to some cases in which marked vertigo and staggering were associated with lesions of the temporal lobe. In two cases of lesions of the right temporal lobe a tendency was noticed in the patients to fall to the right. While it is not clear that the relations between the lesions and the vertigo is that of cause and effect, the connection is certainly suggestive and deserving of study. Dr. Sachs regards cerebellar staggering as undoubtedly one of the symptoms of disease of the quadrigeminal bodies, though probably not developed in the earlier stages of such disease.[2]

It is further believed that impressions from the semicircular canals of the internal ear also influence the movements necessary for maintaining the equilibrium of the body. These impressions are derived from the stimulation of the peripheral expansions of the auditory nerve in the ampullæ.[3]

The fact that section or injury of the canals gives rise to giddiness and a pendulum-like movement of the head toward the plane of the injured canal is urged in support of the theory that they are really sense-organs for the perception of equilibrium. Brewer believes the perception of equilibrium to be due to the perception by the nerve-ends of currents in the endolymph set up by rotation of the head. Goltz's theory is that every movement of the head causes the endolymph to exert the greatest pressure upon a certain part of the canals, and thus excites in varying degree the nerve-terminations in the ampullæ.

Trousseau reasons that as "reflex action may produce its results on the vaso-motor system as well as on the nerves of motion and sensation, it is a legitimate supposition that in lesions of the semicircular canals reflex action influences the nervous system of the brain in such a way as to produce cerebral anæmia, and consequently many of its symptoms, such as giddiness, nausea, and a tendency to syncope." Upon this same hypothesis of reflex action he would also explain gastric giddiness, and similar to this would be the dizziness arising from irritation of the larynx or of the urethra. Dr. Landon Carter Gray regards laryngeal vertigo as one of the manifestations of epilepsy.[4] Woakes also explains stomachal vertigo by reflex action, but believes that it comes from disturbances of the circulation of the laby-

[1] Charles L. Dana, M. D., *Journal of Nervous and Mental Diseases*, July, 1887.
[2] *American Journal of the Medical Sciences*, March, 1891.
[3] Landois and Sterling, *Human Physiology*, p. 603.
[4] Keating's *Cyclopædia of the Diseases of Children*, vol. iv. p. 900.

rinth, caused by irritation of the inferior ganglion of the cervical sympathetic.

The foregoing views as to the functions of the semicircular canals, however, have been combated. It is said that in the pigeons on which the experiment of making section of the canals has been performed the canals cannot, for anatomical reasons, be destroyed without at the same time injuring the cerebellum, thus giving rise to confusion as to the cause of the staggering. Also, Professor Steiner of Cologne having experimented with sharks, whose semicircular canals are easily laid bare without injury to the brain, finds that the canals may be excised, the wound closed, and the fish put back into the water, no disturbance to locomotion following; while if, after laying bare the labyrinth, the trunk of the auditory nerve or the ossicles surrounding it are pulled and stretched, there will be some disturbance of equilibrium, taking the shape of rotary and circular compulsory movements.[1]

It will be seen that the question cannot be considered decided in either way. Almost all textbooks teach that the function of the semicircular canals is to assist in equilibration, though the highest centre of co-ordination of movement is probably in the cerebellum.

The treatment of most acute or accidental vertigoes as defined consists in the removal of their cause, the necessary thing being a correct diagnosis. Vertigo at the onset of acute infectious diseases is merely an incident of the underlying trouble, and its treatment is that of the disease. The vertigo from passing attacks of indigestion often arises from some idiosyncrasy of the individual, in whom certain articles of food may produce severe giddiness accompanied by nausea; thus, one person of whom I have heard is unable to eat bread and butter; other persons are similarly affected by milk, strawberries, shellfish, etc. The indication in such cases is a prompt emetic and future abstinence from such food as is found to be personally poisonous. In other attacks of vertigo induced by acute indigestion the treatment should be directed to the relief of the stomach. If this is sour, give antacids; if the process of digestion has been arrested, emetics are indicated. After vomiting has been produced the swallowing of large quantities of warm water is advised, as it exerts a soothing influence on the stomach. I have had a case of distressing vertigo, with marked staggering to the right, caused by an attack of acute indigestion, the patient being a small boy. I gave full doses of calomel, and found it an effectual remedy.

The acute condition having entirely subsided, the use of tincture of nux vomica and dilute hydrochloric acid will usually restore the tone of the stomach and improve the appetite.

[1] *British Medical Journal*, April 5, 1890.

The treatment of the different toxic vertigoes is of course that prescribed in the materia medica as antagonizing the particular poison by which they have been induced. The distressing dizziness and vomiting following the use of ether is best met by the giving of small bits of ice.

Smoker's vertigo, occurring chiefly in men past fifty years, especially those accustomed to smoke before meals, if not found to be arteriosclerotic in character, may be relieved by complete cessation from smoking and by a slight laxative and bitters (Decaisne).

Nocturnal vertigo may be relieved by a dose of bromide on retiring. The vertigo following the sudden suppression of habitual discharges may be treated by the use of bromides or fluid extract of ergot—15 to 20 grains of the former or from 20 minims to 1 drachm of the latter after each meal.

For the vertigo of sea-sickness innumerable remedies have been suggested, many of which are utterly useless. There are two, however, to which special attention should be called—bromide of sodium and amyl nitrite. The use of the former should be begun at least a week before sailing, and given in 15-grain doses three times a day: it should be continued on shipboard until one is accustomed to the motion of the vessel. Dr. Loomis advises the exhibition of amyl nitrite on the first appearance of nausea, and directs its repetition as often as necessary.[1]

Dr. P. S. Pampoukis offers the following practical suggestion as the result of his investigation:[2] In marine vertigo the use of liquids should be foregone to as great an extent as possible before and during the voyage, for the diminution of the pressure of the blood which results from it is a hindrance to the manifestations of the symptoms of marine vertigo. He further recommends the use of a tightly-drawn ventral bandage, as having the effect of preventing the motion of the abdominal contents and of compressing the abdominal aorta, and diminishing in consequence the cerebral anæmia. He also gives the following prescription:

℞. Cocain. hydrochlor., gr. $3\frac{3}{4}$;
Aquæ, ℥j;
Spirit. vini gallici, ℥ij;
Syr. aurantii,
Mucilaginis cydonii, *āā*. ℥ss.—M.

Sig. A tea-spoonful every fifteen or twenty minutes according to indications.

[1] Loomis, *Practical Medicine*, p. 1079.

[2] "Étude pathogenique et experimentale sur le Vertige marin," *Archives de Neurologie*, Juillet, Septembre, 1888.

Among other remedies suggested is the internal administration of the kola-seed, *Sterculia acuminata*, ½ to 1 drachm of the seed chewed slowly. This is said to be followed in forty minutes by complete cessation of symptoms.[1]

Good results have also been received from the use of "red gum" in the form of lozenges—trochisi eucalypti gummi—grain 1 in each.[2]

Neuhauss states that much amelioration, and even complete cure, may be obtained by lying down "all in a heap," with hips and knees flexed and the head bent forward on the chest, as in this way the vessels are made more tortuous and there is less of a tide in the cranial circulation in consequence. He also regards chloral given in 15-grain doses, not at the commencement, but on the third or fourth day of the disease, as useful. Hydrochlorate of cocaine and antipyrine have also been recommended. While any one of these remedies may prove effectual in relieving the distress of short sea-voyages, probably the only real cure is "custom."

In the vertigo observed among the overworked and underfed give syrup of hypophosphites, wine, and a full nutritious diet (Loomis). In vertigo from overwork in the well-nourished, accompanied by restlessness, insomnia, and depression of spirits (Ramskill), use bromide of ammonium in an effervescing form.

Epileptic vertigo is the form of all others in which a prompt and accurate diagnosis is necessary in order to prevent the formation of what may be called the epileptic habit, which will certainly result from neglect. It is also, unhappily, the form which the general practitioner most often fails to distinguish. Gowers declares that one-sixth of all cases of minor epilepsy are vertiginous. If acute, isolated attacks of vertigo have an epileptic origin, they are, as a rule, accompanied by complete loss of consciousness, which comes on almost immediately at the beginning of the attack. It is true that loss of consciousness may also attend vertigoes arising from other sources, but in such cases it comes on in the course of the attack as a secondary and subordinate feature, not forming, as in epileptic vertigo, the essential constituent of the seizure. As a further means of diagnosis it may be noted that the symptoms occurring between attacks of vertigo, such as confusion, lack of clearness of mind, fear of losing balance, are rarely noticed between attacks of epileptic vertigo. Dr. Weir Mitchell says that persons long liable to any form of vertigo not epileptic can readily cause vertiginous feelings by closing the eyes while standing, by rotation, or by putting a prism on one eye: these tests may assist diagnosis, with which of course the history of the case will have much to do. It is also to be noted that epileptic vertigo may be accompanied by slight but not per-

[1] Surgeon Charles W. Hamilton, R. N., *British Medical Journal*, May 10, 1890.

[2] Surgeon W. M. Russell, *Medical Record.*

sistent tinnitus. The prognosis of this form of epilepsy is the same as in graver forms—*i. e.* better in males than in females, better if the attacks begin after twenty years than before, and better if they are all of the severe variety than if they are light seizures. It is also easier to arrest when there is hereditary tendency and when there are long intervals between the attacks. After the removal, as far as possible, of all causes of irritation in the various organs, the treatment of this vertigo is the same as in the severer forms of epilepsy—*i. e.* the bromide treatment, which is undoubtedly the most valuable of all forms of treatment in this neurosis. These cases of petit mal, however, are more intractable under this treatment than are severer epileptic seizures. I prefer the bromide of sodium to any other of the bromide salts. It is a singular clinical fact that if the patient grow careless and stop taking the drug for a time, it seems, if renewed, to lose its influence unless it has been discontinued for at least a month, or long enough to admit of its elimination from the system, and then again resumed. When the bromide treatment fails to be serviceable, as, unfortunately, it frequently does, Dr. H. A. Hare advises a combination of digitalis with the bromide or of belladonna and bromide.[1]

Hare has noted the fact that the use of nitrite of amyl increases the severity of petit mal. Dr. Starr considers nitro-glycerin the only remedy of any service in minor epilepsy. "In many cases, however, it fails to affect the disease, and as no rule can yet be laid down as to the character of the cases in which it is successful, a trial is always made of it in every new case."[2] It may be given (Gowers) in doses of $\frac{1}{150}$ grain to begin with, increasing gradually to $\frac{1}{25}$ grain. The hygiene of the case is most important: much time should be passed in the open air, all foods having a tendency to cause gastric or intestinal irritation should be avoided, meat should not be eaten more than once a day. The secretions should be carefully regulated, and mental or emotional strain avoided.

Stomachal vertigo (distinguished by different authors as *vertigo a stomacho læso* and *vertigo per consensum ventriculi*) to be diagnosed as such should be accompanied by chronic dyspepsia. The attacks are usually less severe than in acute gastric vertigo; they present the ordinary vertiginous symptoms, but, however severe the attack, the patient never loses consciousness, and if he be the victim of hallucinations never misunderstands their nature. The attack begins in from four to six hours after eating, rarely at an earlier stage of digestion; heartburn is quite a constant accompaniment, and nausea and vomiting may supervene. The vertigo usually takes the objective form—*i. e.* surrounding objects, and not the sufferer himself, seem to be in motion. It has been

[1] Hare, *Epilepsy, its Pathology and Treatment*, p. 193.

[2] Starr, *Familiar Forms of Nervous Disease.*

noted that the giddiness may often be relieved by gazing steadily at one object or by lying down: in this latter respect it is distinguished from the vertigo of cerebral congestion, which is made worse by the recumbent position. The distinction is a useful one, as treatment directed against the latter form will only serve to aggravate stomachal vertigo. It frequently follows severe illnesses, especially those in which the digestive organs have been much weakened or deranged. Attacks may often be warded off by partaking of a cup of bouillon, a cracker, or a glass of wine.

The treatment is that of chronic dyspepsia, and should vary with the indications of each individual case. The use of alkalies and bitters, as suggested by Trousseau, is often very efficacious. Alkaline mineral waters, such as Congress and Hathorn of the Saratoga springs, and Vichy, are to be recommended. Saccharine, starchy, and fatty articles of diet are to be scrupulously avoided, as they give rise to butyric and acetic fermentations. The mental despondency, which is said to bear an immediate ratio to the evolution of carbonic acid gas resulting from these fermentative processes, can best be obviated in my experience by the persistent use of the antiseptic capsule advised by Dujardin-Baumetz:

℞. Naphthol. *α*,
Bismuth. salicylati,
Pulv. carbo ligni, *āā*. gr. iiss.—M.
Ft. in capsul. No. l.
Sig. Two capsules after each meal.

The purpose of these capsules is twofold: first, to cause the absorption of the carbonic acid gas which is evolved; second, to render innocuous the toxic elements resulting from imperfect digestion, which when absorbed exert such a deleterious influence upon the nervous system.

Dr. Willard[1] reports the cure of several cases of stomachal vertigo, which the usual remedies had failed to affect, by the use of blisters, not containing cantharides, on the nape of the neck and, in case of pain in the back, down the spine.

Vertigo occasionally occurs in connection with eye-troubles, such as astigmatism, hypermetropia, paralysis of certain of the ocular muscles, and various eye-strains brought about in different ways. Dr. J. W. Chamberlain informs me he has also seen cases of ocular vertigo in which the only apparent cause was sensitiveness and irritability of the retina. The existence of vertigo in such cases as the last, as well as following surgical interference with the integrity of the eyeball, can only be explained by the theory of Brown-Séquard previously alluded to—

[1] *Medical Record*, June 10, 1886.

irritation of the nerve and reflex action. Ocular vertigo, however, is usually due to weakness or paralysis of an ocular muscle, causing an error of appreciation as to the real relation of the body to seen objects. "The erroneous projection of the field of vision causes a discord between this and other guiding sensations, and one effect of this discord is the sensation that we call vertigo or giddiness" (Gowers). According to the author just cited, ocular vertigo is not independently paroxysmal, but occurs only when the affected muscle is put in action. When ocular vertigo is known or suspected to exist, prompt recourse to an oculist should be had.

Aural vertigo, otherwise known as *vertigo ab aure læso*, labyrinthine vertigo, and Menière's disease, is believed to be caused by morbid processes in the labyrinth and nerve-endings therein. According to some authorities, the disease is limited to the semicircular canal and vestibule, but others think that all parts of the labyrinth are invaded. Knapp regards the deafness for musical sounds in some cases as proof that the disease extends to the cochlea.[1] It usually occurs after the age of thirty years, and is more common in men than in women.

Vertigo may also accompany acute and chronic catarrh of the middle ear, which may be induced by exposure to cold or follow one of the acute specific fevers. The deafness following fevers in which there is no disease of the middle ear is probably caused by serous or hæmorrhagic inflammation in the labyrinth (Ross). The name of Menière's disease, although properly limited to labyrinthine troubles, has also been improperly applied many times to the same train of symptoms when having their origin in the middle ear. In vertigo caused by affections of the outer and middle ear the treatment should be referred to an aurist. The nature of the change in the labyrinth in Menière's disease is necessarily a matter of conjecture: there may be senile changes in the lining membrane, atrophy of the nerve, acute inflammation, hæmorrhage, or serous effusion.

It is thought that giddiness is caused by stimulation of the nerve-fibres rather than by a diminution of their function (Gowers). The disease is characterized by vertigo with or without loss of consciousness, persistent tinnitus, and impaired hearing; noises may be heard in both ears, but are almost always louder in one than in the other. It has been noticed that the perception of musical notes is faulty in many cases of this disease. In the severer form nausea and vomiting follow the vertigo, and the pallor and physical depression are marked. Movements of the head increase the giddiness. After the attack the patient suffers for a few days from slight persistent vertigo. The tinnitus may or may not be increased by the paroxysms of vertigo. The attacks are sometimes accompanied by ocular disturbances, such as

[1] Ross, *Diseases of the Nervous System*, vol. i. p. 412.

double vision, "jerky movements of objects, and distinct erroneous projection in the direction of the movement, so that if the patient attempt to touch an object the hand goes too far in the direction of that object" (Gowers). The attacks frequently come on suddenly, so much so that habitual sufferers are afraid to go upon the street alone. They are paroxysmal, and may occur daily or at much longer intervals: vague vertiginous sensations are observed in the intervening period. These paroxysms may come on spontaneously or be induced by some sudden movement or passing excitement. In the worst cases unusual intellectual effort may determine an attack. They may continue until the impairment of hearing reaches complete deafness, when there is a cessation of all giddiness. "The diagnosis of Menière's disease is rendered certain by the coexistence of pre-existing independent alterations of the hearing, with buzzings or various noises in the ear immediately preceding the attack of vertigo" (Grasset). Cases arising from acute inflammation, from hæmorrhage, or from serous effusion are very grave, but rare.

The reflex cerebral irritation produced by disease of the labryinth is best controlled by bromide: 15 to 20 grains may be given two or three times daily; their effect is thought to be increased by the addition of a few minims of belladonna. Counter-irritation in the form of a small blister or the actual cautery over the mastoid process sometimes alleviates the symptoms. Mitchell advises the combined use of morphine and bromides in the severe attacks. Charcot insists on a special treatment for this disease, and recommends the persistent use of quinine: "8 to 15 grains of quinine given daily in two or three doses and continued for several weeks" (Strumpell). The effect produced at first is that of an aggravation of the disease, caused by the superadding of the aural symptoms usually induced by quinine to those proper to the disease; but if the quinine be omitted for eight or ten days, there is marked improvement in the vertiginous symptoms, and if the course of treatment be continued—*i. e.* the administration of quinine for a period, followed by intervals in which the drug is not used—the attacks of vertigo may be completely arrested. Salicylate of sodium in large doses has also been found useful (Ross), as have bromide of sodium and bromide of ammonium. Ringer advises the use of 10-minim doses of gelsemium daily. Other forms of treatment advised are the hypodermic injection of pilocarpine (4 to 10 drops of a 4 per cent. solution), or injection into the middle ear of a few drops of a 1 per cent. solution of potassium iodide, with an ointment of the iodide of potassium rubbed over the mastoid process, the constitutional treatment being from 5 to 15 grains of potassium iodide three times a day. Electricity may be used in the later stages of the disease, though not in the earlier ones, but good cannot confidently be predicted to follow its use. Hydro-

bromic acid has also been recommended. The general health should be the object of careful attention; concurring bowel or stomach troubles should be carefully shunned, and the patient should avoid stooping or abrupt movements of the head.

The vertigo accompanying neurasthenia and hysteria is relieved by the treatment of those diseases, which is too extensive to be entered upon here. On general principles the vertiginous state, except in the case of the markedly anæmic and debilitated, may be treated by bromides. In the vertigo of anæmia the cause should be removed by building up the patient with such tonics as iron, quinine, and strychnine and by a full nutritious diet, while the accompanying vertigo may be treated by alcoholic stimulants, nitrite of amyl, and agents of like character.

In the vertigo accompanying cerebral hyperæmia the common causes of the latter, such as too much mental strain, strong emotional conditions, etc., should be removed, while the vertiginous attacks should be treated by bromides, or, better still, by a combination of bromide and fluid extract of ergot in the proportion of 15 grains to a tea-spoonful every four to six hours. At the same time the bowels should be kept open, preferably by a saline cathartic. I have by this method relieved the most distressing forms of vertigo seen in this disease. The actual cautery upon the nape of the neck and gentle galvanic current applied to the head are at the same time useful. I can heartily recommend the suggestion of Dr. W. A. Hammond as to the use of pepsin and powdered charcoal in connection with bromide should dyspeptic symptoms be associated with the condition. The attendant hygienic conditions should be good; open-air exercise, daily bathing, and Turkish baths are of use; and, above all, the moderate use of the brain should be insisted upon.

Dr. Gerlier of Fernex in 1886 first called attention to a curious malady to which the name of paralyzing vertigo, or Gerlier's disease, has been given. It has been observed only in certain districts in Switzerland, occurring in warm weather and attacking chiefly farm-laborers. Muscular relaxation, cervical pain, and ocular disturbances are pointed out as three pathognomonic signs. The attack usually begins with dimness of vision, haze before the eyes, amblyopia or diplopia, and ptosis, followed by rotary vertigo and staggering, the person attacked often falling to the ground. There seems to be a general weakness, which, appearing first in the eyelids, extends successively to the neck, arms, and legs. There is no loss of sensation, no tingling or numbness. The clinical picture, however, is said to vary greatly in different cases, and the symptoms are not constant. The attacks usually last about ten minutes. The treatment of this affection is undetermined and the causes obscure. Ladame, who has published a study of the disease,

rejects the hypothesis first advanced, of an organic infection, in favor of that of a "cortical disturbance in the spreading of which psychical contagion acts as an important factor."[1]

Vertigo is also found associated with the lithæmic and allied states. The condition of hepatic incompetence, with its group of associated symptoms known by the various names of lithæmia, uricæmia, uric-acidæmia, is no longer believed to be due simply to the pernicious influence of uric acid and the oxalates upon the nervous centres. "There are now known," says Dr. Porter, "to exist between the serum-albumin when introduced into the body and its most complete form of oxidation, urea, twenty-eight nitrogenous compounds, some of which are deadly poisons. These poisonous elements, circulating in the blood, act differently upon various parts of the nervous system and functions of the body."[2]

"I believe," says the same writer, "that all of that host of vague, ill-defined 'bilious' 'neurasthenic' symptoms are best explained by the passage into the general circulation and the incomplete elimination from the body of an almost innumerable number of ptomaïnes and leucomaïnes, products of an incomplete nitrogenous oxidation."

Of this condition vertigo is a leading and distressing symptom. With it may be associated sleeplessness, noises in the ears, sensitiveness to odors, neuralgias, paræsthesias, vaso-motor disturbances, excruciating pains in the head, double vision, amblyopia, hypochondriasis, depression of spirits, and melancholia.

According to Dr. Haig,[3] "the great cause of uricacidæmia (lithæmia) is—first, the accumulation of uric acid in the body; second, the appearance on the scene of a supply of alkali to bring it into solution in the blood, such supply of alkali being met with in nature generally as the result of some failure of nutrition. . . . . As I have pointed out before, it may be enough to alter the diet and reduce the nitrogenous metabolism, while providing for the continued free excretion of all the uric acid formed; but in older men it will be necessary to clear out the stores that have accumulated in past years, as well as to reduce formation; and the clearing out is probably best effected by a course of salicylate of sodium, continued if necessary for weeks and months till the daily excretion of uric acid remains for some time at the level of the formation (1 to 33); and this being accomplished, the nitrogenous intake should be reduced to the lowest level compatible with healthy nutrition. If in place of a salicylate you give an alkali to aid the

[1] *Brain*, winter number, 1889.

[2] "Digestion, Assimilation, and Oxidation, their Normal and Abnormal Conditions in Relation to Health and Disease," William Henry Porter, M. D., *The Medical News*, Jan. 10 and 24 and Feb. 28, 1891.

[3] "Uric Acid in Diseases of the Nervous System," by A. Haig, M. A., M. D., *Brain*, Part 53, 1891.

removal of the accumulated uric acid, you will produce intense uric-acidæmia, and precipitate in one form or another the troubles we are anxious to avoid."

In the presence of a uric-acid storm he advises clearing the blood by the use of mineral acids, and, where they fail, by the exhibition of opium or mercury in small doses. After the headache has passed, give salicylate of sodium for several days to sweep the uric acid out of the body. The salicylate should never be administered while the headache is present, as it will then cause nausea and increase the gastric distress, and the headache will be much worse than if nothing had been done. Haig's dictum is, "Give acids first, and get the stomach into a good humor, then give the salicylate."

Directly opposed in some particulars to the foregoing treatment is that recommended by Dr. Porter. This method I myself have used successfully in the case of patients suffering from uricacidæmia in whom other forms of treatment had failed to relieve it. The first indication in this treatment is usually a brisk mercurial purge, after which the following prescription may be advantageously administered:

℞. Fel bovis inspiss., ʒj;
Piperini,
Quininæ sulph., āā. gr. xxx.—M.
Ft. in caps. No. xxx.
Sig. Take one capsule before meals.

The patient should be put on a strictly *nitrogenous* diet. He may eat meat, all kinds of fish, oysters, game, poultry, soup if not greasy, butter, toasted bread; he may take ice-cream once a week; water in abundance, milk, buttermilk. He should avoid sugars, starches, and vegetables. He may also use freely lithic and alkaline waters, although their efficacy in these conditions is questioned by Dr. Porter, who thinks their chief value lies in their psychical effect, not in their therapeutic action, believing that the improvement which has followed their use in many cases is attributable to the accompanying change of diet. He thinks: "They pass through the system unchanged until they pass out through the urinary channels, where the uric acid contained in the urine displaces a hydrogen element and changes the form of the salt, forming a soluble urate. The uric acid does not appear in the urine, but the systemic abnormalities go on just the same. If the alkaline water were placed in the chamber and the urine discharged into the vessel the same result would be obtained."

As a matter of fact, the patients suffering from these troubles usually consume only a limited amount of fluid, and therefore are greatly benefited by the increased amount of water introduced in this way into

the system. If the patient be constipated, a little extract of cascara sagrada, sufficient to overcome the difficulty, may be added to the foregoing prescription. The importance of removing from the colon any impacted fæcal matter, which is so constant an attendant of these cases with chronic constipation, must not be overlooked. Stimulation of the lower bowel and removal of the impacted matter may be brought about by the use of fel bovis when other means have failed: it is useful as well in bringing away the gas and relieving tympanites. It may be used in the following prescription:

℞. Fel bovis inspiss., ℥j;
Glycerini, f℥iv;
Ol. ricini, f℥ij;
Aquæ, q. s. ad f℥viij.—M.

This should be added to a pint—or, better still, a quart—of warm soap-suds; the larger amount can be retained when slowly injected into the lower bowel.

In addition, I recommend daily sponge-baths, using rock or sea salt dissolved in the water. Careful massage has also in my experience proved very beneficial. As much exercise in the open air as possible should be taken, not alone for the sake of the exercise, but for the oxygen so much needed by this class of patients.[1]

In addition to the treatment to reduce the excess of uric acid in the system, the Dujardin-Beaumetz antiseptic capsule should be used to render harmless the ptomaïnes and leucomaïnes which have escaped the peptone-destroying action of the hepatic cells.

Recovery may be materially hastened by the exhibition of strychnine or nux vomica. Dr. Bartholow recommends the use of Fowler's solution of arsenic for the removal of the vertigo and hypochondriasis. It should be given in small doses and administered for some time.

Grasset distinguishes and describes another chronic vertigo, which he calls cardio-vascular vertigo or the vertigo of arterio-sclerosis. If the conclusions which he reaches as to the symptomatic importance of vertigo in arterio-sclerosis, and the relation of that to certain other diseases, such as Bright's disease and softening of the brain, be accepted, the diagnosis of vertigoes of this class and the treatment of the conditions they indicate is of the first importance, as it may result in the cure, or rather prevention, of morbid conditions now practically regarded as hopeless. His theory, following Huchard, is briefly as follows: Arterio-sclerosis is a general and chronic disease of the entire arterial system, which, while affecting the whole system, can present

[1] "Fel Bovis Inspissatum, its Importance and Uses as a Therapeutic Agent," *Medical News*, May 2, 1891.

marked localizations in different organs. Its course may be said to consist of two stages: the initial stage of general vascular sclerosis, in which, under proper treatment, the prognosis is favorable; and the stage of localization in some vital organ, in which medication has usually only an alleviative value. As the localization may take place in very diverse organs, arterio-sclerosis will be found as the common initial tie between diseases systematically very distinct, such as atheroma, Bright's disease, angina pectoris, softening of the brain, medullary sclerosis, cerebral hæmorrhage.[1]

Most commonly the diagnosis of the disease remains undecided through all of the initial and curable stage. The physician finds himself in the presence of vague, obscure, ill-defined symptoms, and knows that he is witnessing the first period of some morbid evolution, but what will be the outcome is a matter of uncertainty. When the organic localization finally becomes evident, the preceding symptoms are usually promptly attributed to that instead of to the parent disease.

Vertigo is one of the symptoms *par excellence* of arterio-sclerosis in its initial stage: the successful diagnosis of the disease at this period will be assisted by remembering that the anatomical basis of arterio-sclerosis is arteritis; that irritating causes before provoking arteritis occasion a spasm of the small arteries, intermittent and passing at first, but becoming more and more lasting, whose immediate consequence is an arterial hypertension which forms the point of departure for inflammation of the vessels and subsequent arterio-sclerosis.

The functional symptoms of arterial hypertension are habitual depression, shortness of breath after exertion and climbing, painful palpitations, coldness of the extremities, slight precordial pains, and fits of pallor. (It will be noticed that these are the classic premonitory symptoms of Bright's disease, but they are as frequently observed in the initial phases of softening of the brain or aortic cardiopathies.) The physical signs are a presystolic mitral murmur, which, however, has only an ephemeral existence, and the presence of an accentuated diastolic throb in the aortic vestibule; that is to say, in the region of the most interior part of the second or third right intercostal space. This should be distinguished from the clangorous noise or tympanic throb of the second aortic sound, which indicates a more advanced lesion. This diastolic aortic beat is one of the most enduring and constant symptoms of arterio-sclerosis: it is nearly always present, and exists independently of any ultimate localization which may take place in the course of the disease. Other associated signs, besides the increase of vascular tension, are the greater hardness of the radials, the flexuosity of the tem-

[1] See *Du Vertige cardio-vasculaire, ou Vertige des Arterio-sclereux*, par le Professeur J. Grasset. In the above paragraphs concerning arterio-sclerotic vertigo I have merely condensed Grasset's monograph upon the subject.

porals, and slight polykiuria. In addition there may be headaches, neuralgia, and somnolence.

The vertigo of arterio-sclerosis may be either vertigo in the first degree, vertigo accompanied with loss of consciousness and falling, or vertigo with permanent slow pulse (20–30 pulsations per minute), and epileptiform or syncopal attacks. With reference to this last form of vertigo, which is very rare, it may be said that Charcot regards it as due to an alteration in the spinal cord in the cervical region or in the medulla, but Grasset, following Huchard, who has carefully studied this concourse of symptoms, and gave to the prodromata of vertigo with permanent slow pulse and epileptiform or syncopal attacks the name of Stokes-Adams' disease, regards it as due to a general cardio-vascular alteration which in localizing itself upon the medulla gives rise to the symptoms in question.

Grasset asserts that the greater number of vertigoes associated with cerebral affections are due to precedent arterio-sclerosis, recalling the fact that vascular lesions play a most important part in the production of softening of the brain, general paralysis, locomotor ataxia, and multiple sclerosis. In the greater number of cases arterio-sclerosis opens the scene with its now well-defined symptoms, and localization upon the nerve-centres follows at the end of an indefinite period of time.

In addition to the symptomatology of arterio-sclerosis in its initial stage, there are certain signs by which one may recognize the disease when localization upon some vital organ is threatening. This ultimate localization is preceded by what has been termed the intermittent claudication of that organ—*i. e.* the recurrence of fleeting and paroxysmal attacks in which the function of the organ in question is suspended or interrupted—which is explained in this way: When arterio-sclerosis invades a vital organ, the circulation is impeded in that organ. The impediment is not sufficient to prevent the ordinary acts of life, but if at any given time the function increases, the organ, becoming insufficient for the effort, makes as it were a few false steps, and then ceases for the time being to functionate. Presently, having acquired fresh energy, it takes up again the interrupted function. When the threatened localization is upon the nervous system, it may relate to either the spinal cord, brain, or mesocephalus. If upon the cord, the intermittent claudication of that organ will be shown in the intermittent association with vertigo of passing paraplegias, contractions, local sensitiveness, anæsthesias with or without tingling, etc. Only the paroxysmal character of these phenomena guides one in referring them to their cause, and prevents the supposition that they are due to organic lesions of the cord. The intermittent claudication of the brain may be attested by slight hemiparesias, amnesias, intellectual fatigue, and even transient aphasias; while when bulbar localization is in question fleet-

ing manifestations of the respiration of Cheyne-Stokes have been observed.

At a more advanced stage the localization in some vital organ becomes permanent and irremediable, and to the intermittent claudication of the organ succeed the symptoms of a definitive rupture of the functional equilibrium.

Arterio-sclerosis may arise from a number of diseased states, of which may be enumerated chronic rheumatism, gout, the entire family of arthritic diseases and hepatic maladies, and may include among its manifestations diabetes, asthma, migraine, lithiasis, and obesity. Certain chronic poisonings, as those produced by alcohol, lead, and tobacco, as well as marsh-poisoning, syphilis, and advanced age may also be the cause. Oftener than not arterio-sclerosis is found to exist as the resultant of more than one of these predisposing causes. When, therefore, any of these morbid conditions or any group of them is present associated with habitual vertigo, it is likely that the connecting link is arterio-sclerosis, and in the effort to diagnose the vertigo the symptoms of the former disease should be carefully sought for, and the possibility recognized that the vertigo may belong to the fourth great clinical type.

The vertigo of arterio-sclerosis will not prove amenable to any of the medications effective in other vertigoes. It has a distinct treatment, based upon the idea that it is necessary to modify the arterial tension. The principal agents for this purpose are iodide of sodium and trinitrine. Iodide of sodium is the chosen remedy. It is preferred to the iodide of potassium, a far more poisonous salt, whose action upon the arterial tension is markedly less. The doses of the iodide should never be large, as in syphilis. A dose of 15 grains a day is sufficient, but the medication should be continued for a long time, even for a period of years. The usual prescription is—

℞. Sodii iodidi, ʒiiss;
Aquæ, fʒx.—M.
Sig. A table-spoonful morning and night before meals.

If this mode of administration is repugnant to the patient, the iodide may be given in beer, milk, or a syrup made from the rind of bitter oranges.

Trinitrine or nitro-glycerin is also indicated. It has an actual effect upon the vaso-motor system, diminishes the tension of the blood, and provokes congestion of the peripheral vessels. It is prescribed in the 1 per cent. solution in alcohol, 4 drops night and morning in a little water.

Trinitrine and iodide of sodium may be used simultaneously or

may alternate. It is thought well to associate them at the beginning of the treatment; later the iodide may be given for the first twenty days of the month, and trinitrine for the last ten days. To this medication must be added rigid hygienic observances. Tobacco, alcohol, spices, and high feeding are prohibited, and exercise, open-air life, milk, white meat, and vegetables are recommended.

When the vertigo is accompanied by strongly marked epileptiform attacks, the following prescription is used in place of the foregoing:

| | |
|---|---|
| ℞. Sodii iodidi, | ʒiiss; |
| Sodii bromidi, | ʒv vel ʒviiss; |
| Aquæ, | fʒx.—M. |

Sig. A table-spoonful morning and evening.

The bromide is not addressed to any supposed epileptic basis for the attack, but merely to the symptomatic form.

In case of malnutrition and defective forces there may be added to either of these prescriptions $1\frac{1}{2}$ grains of arseniate of sodium, making a dose of $\frac{15}{100}$ grain a day.

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## TREMORS.

Tremor is a symptom common to many diseases of the nervous system. It may be functional, organic, or toxic in character.

The cause of tremor is a matter of speculation. It is thought that it may be caused by lesions in and about the optic thalamus or by cortical disease. According to Mercier,[1] "Tremor is that modification of the normal muscular action which occurs when the successive simple contractions follow one another too slowly, and when the beginnings of the relaxation become apparent." This modification will be manifest when for any reason the storage of force in the nerve-cell is diminished and its rhythmic discharge interfered with. This hypothesis suggests the possibility of tremor arising from the spinal cord and peripheral lesions, although but little is definitely known about it.

There are two types of tremor: the first, of which paralysis agitans is an example, continues whether the body is at rest or in motion, except during sleep; the rhythmic oscillations are of small extent and short duration; this has been distinguished as *tremor coactus*. In the tremor of which disseminated sclerosis is the type the trembling is produced when voluntary action is attempted, and the oscillations are of large extent; this has been termed *tremor a debilitate*.

[1] *The Nervous System and the Mind*, p. 53.

Charcot[1] divides tremors also with reference to the number of oscillations per second, distinguishing as slow tremors those of disseminated sclerosis, paralysis agitans, and senile trembling, in which the oscillations are from four to five per second; rapid or vibratile tremors show from eight to nine oscillations per second: such are those resulting from alcoholic and mercurial poisoning, general paralysis, Basedow's disease, and the abuse of tea and tobacco.

In addition to the foregoing causes tremor may arise from fatigue, lead-poisoning, the chloral and opium habits, writer's cramp, and hysteria; it may follow exhausting diseases, over-exertion, or great excitement. The trembling seen in ague or following exposure to cold is a form of tremor familiar to all. We may also include convulsive tremor (the paramyoclonus of Friedrich) and the fibrillary tremor of progressive muscular atrophy.

Tremor may occur independent of any discoverable diseased condition, in which case it is distinguished as essential tremor. Essential tremor may be hereditary or may be associated with a nervous diathesis. Gowers[2] quotes a case in which a gentleman suffered throughout his life from tremor, dying at the age of eighty-two years; his sister also trembled, and his mother after a mental shock showed tremor in the latter part of her life. Its duration is great, and it may even extend over an entire lifetime, at times subsiding spontaneously or as the result of treatment. It is unaccompanied by weakness or rigidity, ceases when the body is at rest, and is aggravated by motion. It is at times subject to the control of the will. The hands and head are chiefly affected, but the muscles of the face and tongue often present an irregular tremor on movement, and the patient's aspect may closely resemble that of one affected with delirium tremens or general paralysis of the insane (Gowers).

Dr. Mills[3] reports two cases of diffuse undulatory tremor accompanying chronic spinal degeneration, in which the marked feature was the universality of the tremor, which extended to the muscles of the thighs, legs, arms, forearms, and trunk. "Wave-like movements were present all the time. The surface of the body presented the appearance of a gently undulating sheet of water."

Treatment to affect essential tremor must be commenced in its incipiency. Spinal galvanism and galvanization of the cervical sympathetic is indicated. Various baths have been advised; good results have been reported from the use of hyoscyamus and its alkaloids. Of the latter, the hydrobromate of hyoscine is the one to be preferred; it should be given in tablets of $\frac{1}{100}$ grain from one to three times daily according

[1] Charcot, *Diseases of the Nervous System*, p. 85.

[2] *Diseases of the Nervous System*, p. 1014.

[3] *Journal of Nervous and Mental Diseases*, March, 1890.

to the constitutional effect. It is not to be pressed after the appearance of slight dryness of the throat. The good results obtainable from this treatment are accentuated by the use of tonics and reconstructives. Sinkler [1] quotes Eulenberg as using arsenic with success, and also attests the value of the treatment from his own experience. It may be taken either hypodermically or per orem; it should not be used hypodermically if it can be borne by the stomach, as its hypodermic use in no way increases its therapeutic value. Should the stomach of the patient absolutely refuse to tolerate the gradually increased doses of Fowler's solution, it may be combined in equal proportions with glycerin and injected in the skin of the forearm: an injection of 6 minims of this mixture may be administered first, and the dose gradually increased by 1 or 2 minims a day until its physiological effects are apparent. Abscesses do not usually occur in well-nourished patients, especially if the injections are not too frequently made in the same locality, and if antiseptic precautions are carefully observed. One injection daily is sufficient (Dr. G. M. Hammond). Statical electricity is undoubtedly beneficial to this class of patients.

Tremor unassociated with muscular weakness or rigidity is frequently observed in elderly persons. It begins usually in one or both arms, extending to the head. The tremor is fine, ceasing during rest. Treatment has little or no influence over it.

The tremors due to toxic and organic diseases, as well as those arising from hysteria and neurasthenia, will be relieved, if the conditions are such that relief is possible, by the treatment proper to the accompanying disease.

Pitres Bordeaux, as quoted by Grasset,[2] distinguishes and describes as follows three forms of hysterical tremor: first, tredidatory, in which the tremors are habitually localized in a lower limb; they are constituted by the alternate, regularly rhythmical oscillations of direct extension and flexion of the foot upon the leg, the leg upon the thigh, the thigh upon the pelvis, and much resemble the epileptiform shaking following scleroses of the pyramidal tracts, having the same amplitude and rapidity (from five to seven vibrations per second), with the same rhythmic uniformity; second, vibratory, in which the tremors are very small, short, and uniform, giving to the members rapid vibratory oscillations; they may occur in any part of the body, but are more frequent in the upper limbs; in some cases the tremors in the fingers and hands are only seen when the patients extend their arms horizontally; these tremors, generally speaking, do not actually prevent voluntary movements, but cause a certain degree of awkwardness in the accomplishment of any act demanding precision and address; the symptoms

[1] Pepper's *System of Medicine*, vol. v. p. 429.
[2] *Archives of Neurology*, Sept., 1890.

are not constant, sometimes being those of Graves' disease, sometimes those of paralysis agitans, while at times they simulate senile or alcoholic trembling; third, the intentional tremors, having the same symptoms as multiple sclerosis.

Apropos of a case of hysterical trembling after the form of senile tremor, Grasset suggests the possibility that many cases of so-called senile trembling, especially when it occurs in younger persons, may have an hysterical origin: he has noted in some such cases narrowing of the field of vision and inversion of the phosphatic formula, and suggests that the latter symptom especially may have a value in differentiating hysterical from other tremors. Normally, the ratio of the earthy to the alkaline phosphates in the urine is that of one to three, but during attacks of hysteria it has been noticed that this ratio changes, the earthy phosphates increasing in quantity until the ratio is one to two, or even one to one. It is, however, a matter of much difficulty to decide in these cases whether one is in the presence of a purely functional disturbance or of an organic lesion. Grasset's method of treatment in a case of supposed hysterical tremor, as given in the article referred to, would be first directed against the neurosis: he gives at first large doses of antipyrine, 75 grains a day; if this is without effect, he tries solanine. If the medication directed against the functional trouble is unsuccessful, it should be changed for medication directed against the lesion, this consisting of counter-irritation frequently repeated, and of the iodide treatment alternated with chloride of gold. A case of hysterical tremor reported by Remond following the type of multiple sclerosis was discharged cured in less than a month, the only medication used being small doses of bromide given with elaborate directions, and much stress being laid upon the wonderful merit of the remedy.

The cases falling under the clinical group designated as convulsive tremors (the paramyoclonus multiplex of Friedrich) present very wide differences in appearance, the only feature in common being "the sudden shock-like character of the muscular contractions, their bilateral symmetry, and the freedom of the extremities." It is bilateral in character and affects muscles similarly situated. In Friedrich's patient the tremor manifested itself in the upper-arm muscles and the supinator longus, and in the muscles of the thigh, especially the quadriceps. In addition, the muscles of the back, face, neck, abdomen, and diaphragm may also suffer. There is no ataxia, paralysis, or anæsthesia; electrical irritability is normal; the consciousness of the patient is unimpaired. The disease usually occurs in males, and manifests itself between the ages of ten and fifty-two years (Gowers): it is supposed to be caused by fright or by mental or physical overstrain. The convulsive seizures are usually in abeyance during sleep; voluntary motion in some cases lessens, in others increases, the tremor. Tonic contractions may alter-

nate with the clonic movements; the rate of contraction, according to Starr, may vary from fifty to one hundred and eighty per minute. Some cases are so mild in character that no tremor is perceptible except under the closest inspection. Convulsive tremor is unquestionably a functional neurosis. "Whether it has a central origin, and is produced by a hyperexcitability of the brain and spinal cord, induced by the sudden vaso-motor spasm accompanying fright or mental or physical strain, as Friedrich believed, or whether it may be a reflex spasm due to some peripheral irritation, which being conveyed to the spinal and medullary centres produces the spasm reflexly, . . . . remains for the future to decide." [1]

The prognosis is favorable.

The treatment consists of the actual cautery repeatedly applied to the nape of the neck and spinal galvanization. The anode should be applied to the sensitive spots, if such exist, in the spine. Dr. Fry reports the recovery of a case in three weeks from following this treatment.[2]

Aside from this, Dr. Hammond recommends the use of gradually increasing doses of strychnine. "A solution of the sulphate of strychnine consisting of 2 grains to the ounce of water is administered in doses of 10 drops three times a day, and increased until the physiological effects of the drug are obtained. A return to the original dose of 10 drops is then directed, and an increase as before. From 30 to 35 drops are generally necessary to cause slight rigidity of the muscles of the head and neck." He also advises the use of bromide of zinc, preferring it to any other remedy, and using a solution of 1 drachm to the ounce of either water or simple syrup. "Of this mixture 10 drops are given three times a day for the first two weeks, then 15 drops three times a day for the next fortnight, and so on, increasing 5 drops for the dose of each subsequent two weeks. This is continued for several months, after which the dose is reduced. The general hygienic condition of the patient should be given careful attention.

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## LEAD-POISONING.

SERIOUS primary and secondary consequences may follow the presence of lead in the system, but it is through the medium of the latter that death by lead-poisoning most frequently occurs. Lead-poisoning has been universally observed to produce a deficiency of urea and uric

[1] Starr, *Familiar Forms of Nervous Disease*, p. 250.

[2] *Journal of Nervous and Mental Diseases*, 1888, p. 397.

acid in the urine, resulting in what has been called saturnine gout, which in its turn leads to arterial, cardiac, and renal difficulties. The probable mechanism by which these results ensue is of considerable value to the therapeutician, as indicating the sequence of conditions that may arise to be combated in a case of lead-poisoning, and may be briefly outlined as follows:

Lead diminishes the alkalinity of the blood (Ralfe), and by so much as it does this lessens the solubility of uric acid in the blood, and in the same degree its excretion in the urine; increasing in like manner the tendency to "uratosis"—*i. e.* "the precipitation of crystalline urates (crystalline sodium biurate) in the tissues or fluids of the body."[1] It is the opinion of Roberts that we should not speak of "ordinary" and "saturnine" gout, but rather of "gouty uratosis" and "saturnine uratosis," since the tendency to uratic deposits is the common link connecting the condition of those poisoned by lead and those possessing the gouty diathesis. The possession of this one vice would necessarily give to two otherwise radically distinct primary disorders a very close resemblance in regard to their symptoms and physical signs, because the latter almost entirely depend upon the direct local effects of the uratosis which is common to both." Gout, especially when of saturnine origin, is recognized to be one of the most powerful generators of arterio-sclerosis (Grasset); and, this morbid condition once set up, death may result from the ultimate localization of the disease, according to its custom, upon some vital organ. In the arterio-sclerosis resulting from lead-poisoning this localization is very frequently upon the kidneys, on which there is in the first instance in plumbism a strain, since the elimination of lead takes place so largely through the kidneys. It is believed that the metal, in addition to the diseases which it causes in this manner, has also a direct injurious influence upon the renal and hepatic cells.

There are various theories advanced to account for lead-paralysis and its accompanying atrophy—as, that it is primarily muscular in character; that it is simply a peripheral neuritis; and, finally, that it consists of an inflammation of the ganglionic cells of the anterior cornua of the spinal cord. Bernhardt has conclusively shown that the supinator longus and flexors, which usually escape, contain as much lead as the extensors, which are paralyzed; such being the case, the paralysis could not result from the direct action of lead upon the muscular tissues. That many cases are due to a peripheral neuritis there can be no reasonable doubt. They are chiefly those which we have designated as the neuritic type—"wrist-drop." Alcohol, arsenic, and other toxic agents are well known to cause inflammation of the peripheral nerves. Gowers regards the "peculiar limitation of the paral-

[1] Sir William Roberts, *British Medical Journal*, Nov. 22, 1890.

ysis of the muscles supplied by a single nerve as suggestive of its neuritic origin;" and he regards as especially confirmatory of this view the fact that it is in cases of simple "wrist-drop" that the integrity of the spinal marrow has been found most usually intact. That peripheral neuritis will not account for all of the phenomena observed in lead-paralysis is very evident. Many cases, chiefly those of the myelitic type, can be explained only upon the supposition of the involvement of the central nervous system. Dr. W. R. Birdsall has found in an autopsy on a case of lead-paralysis the presence of a mild grade of sub-acute myelitis. "In fact," says Erb, "the whole state of things in lead-paralysis with reference to motility, atrophy, electrical reactions, the absence of disturbance of sensibility, etc. is so entirely analogous to that in poliomyelitis anterior chronica that we are almost forced to the theory of changes in the anterior gray horn." There are mixed irregular cases in which there seems to be involvement of both the peripheral nervous terminals and the anterior horns of the cord; and it is a debatable question as to whether the toxic influence of the lead is manifested simultaneously upon the ganglionic cells of the anterior cornua and the peripheral nerve-terminations, or whether it affects primarily the filaments of the peripheral nervous system and extends upward to the multipolar cell of the cord, thus causing a secondary myelitis.

The paralysis and atrophy found in lead-poisoning, then, may arise from either of two sources—namely, it may be peripheral, a toxic neuritis which may be more or less generalized, usually, however, localized in its influence, and manifesting a special affinity for the musculo-spiral nerve, or it may assume all the characteristics of a poliomyelitis, which may likewise be localized or disseminated, and which may be in every way absolutely identical with the idiopathic form of this affection.

The muscles in chronic lead-poisoning are atrophied, small, and pale; there are a loss of striæ and a marked increase of connective tissue. Ultimately, all muscular tissue may disappear and fat and connective tissue take its place.

In diagnosis the "lead line" should first be carefully looked for. If the teeth are kept scrupulously clean and the gums in every part in close approximation to them, then the absence of the blue line by no means excludes the possibility of lead-poisoning. If, however, the converse be true, the absence of the lead line under such circumstances is usually sufficient evidence that lead toxæmia does not exist. Silver-poisoning causes a line similar to that produced by lead, but the bluish tint of the skin in the former case serves to differentiate the two toxæmias. The presence of the blue line, however, is not necessarily evidence that the patient is, at that time, suffering from the toxic effects

of lead, as it may continue after the poison is no longer active. Lead exists in combination with the albumin of the tissues of the body, and while iodide of potassium decomposes the albuminates with which lead is united and sets it free, it has no action whatever upon the lead sulphide in the gums, and the blue line disappears very slowly. It has been known to exist after two years' treatment with iodide of potassium, the patient in the mean time having been removed from all deleterious influences. The usual symptomatology of these cases will ordinarily make the diagnosis clear. In cases of doubt or obscurity there should always be a careful examination of the urine. This analysis should not take place, however, until about a week after the administration of iodide of potassium has been begun. "A ready method is that proposed by Reeves: A piece of sulphide of potassium is enclosed in a piece of thin white linen and suspended in a vessel containing the urine suspected to contain the lead, set free by the previous administration of iodide of potassium. It is left there for five or six minutes. If the urine contains any salt of lead, it is decomposed and the metal is deposited on the linen in the form of sulphuret, staining it of a dark, almost black, color" (Hammond).

The characteristic "wrist-drop" cannot well be confused with pressure paralysis of the musculo-spiral nerve: the latter is always unilateral, and the supinators do not present the immunity which is the characteristic feature of lead-paralysis. If the hand of the patient is semi-pronated and the forearm flexed upon the arm, and an effort be made to extend the forearm against resistance, the tense supinator longus can readily be seen as well as felt strongly contracted beneath the hand (Buzzard). If the excitability of both supinators be diminished or absent to the faradic current, according to the author just cited the case is almost positively one of lead-poisoning. The wasting of the extensor communis digitorum will usually uncover the supinator brevis to such an extent as to allow of its being stimulated, which in health is not possible because of its deep situation. The peripheral neuroses resulting from alcohol, arsenic, and silver all vary so materially in clinical history that this alone, aside from their differences of symptomatology, will generally serve to differentiate them from the neuritis of lead-paralysis. It must not be forgotten that progressive muscular atrophy has been known to develop after the manner of the neuritic atrophy of lead-paralysis, but the history of the case will usually serve to differentiate it.

Lead encephalopathy may be distinguished from cerebro-spinal meningitis by the fact that the rise of temperature in the former is slight, if present at all, while in the latter the temperature frequently reaches 104° F.

The prophylaxis of lead-poisoning is of the utmost importance.

There is no known antidote to lead, and the use of sulphuric-acid lemonade is utterly valueless, the resulting compound, lead sulphate, being in every sense as deleterious to the system as any of the other combinations of this metal. Of no value, too, are drinks containing nitric acid and sulphuretted hydrogen (Naunyn). Sponges, respirators, masks, and similar devices to prevent the inhalation of the dust by workers in lead-factories have not proved as efficacious as was expected. Of the most value are careful hygienic measures. Absolute cleanliness must be insisted upon on the part of those habitually exposed to the influence of lead. Work should never be begun on an empty stomach. As in lead-factories some parts of the work are more dangerous than others, Des Planches strongly recommends rotation of labor, so that no one operative may be continuously employed in the most unhealthy work.

If in spite of all precautions lead makes its way into the system, the first step toward recovery is to remove the patient from the toxic influence, and next follow measures for its elimination from the system. Iodide of potassium is the most useful agent for this purpose, and has been shown to separate the lead from its combination in the tissues, forming an iodide of lead, in which form it is excreted by the kidneys. Authors differ as to the exhibition of the iodide when the symptoms are markedly acute in character, supposing that the rapid elimination of lead from the tissues and its passage into the blood increase the poisonous effect. With this view, however, Dr. W. A. Hammond does not agree, as he has never seen the least untoward results from the free use of large doses of iodide from the very first. The dose should be from 5 to 15 grains, with frequency according to the urgency of the case—from three times a day to every four hours. It has been shown that the efficacy of the iodide in releasing the lead is greatest at first, the quantity excreted diminishing afterward; but if the use of the drug is suspended for a time and then renewed, the quantity again increases. The administration of sulphur baths is of doubtful utility. Great value is attributed by Wilks to the electric bath. "To show that its value is not due to galvanism alone, I may state that lead has been found in the bath after the water has been used a few times."[1] Hot-water baths have also been found useful. Dr. D. W. Hand reports a case of lead-poisoning from cosmetics in which the use of hot baths, in conjunction with iodide of potassium and stimulation of the renal function, was followed by a surprisingly rapid improvement.[2]

Iodide of iron, quinine, strychnine, and constructive measures are efficacious in relieving the anæmic and cachectic conditions of lead-

[1] Wilks, *Diseases of the Nervous System*, p. 336.

[2] *North-western Lancet*, Oct. 15, 1886.

poisoning. Should laxatives be indicated, use such saline aperients as the sulphates of sodium and magnesium or else castor oil and senna.

In lead colic great relief can be obtained by means of warm baths, hot applications to the abdomen, and the use of rectal injections of water at a temperature of 113° to 115° F., as suggested by Tripier. Should these measures not be sufficient to alleviate the pain, relief can best be obtained by hypodermic injections of morphine and sulphate of atropine. Sometimes after a single injection the pain and spasm of the bowel are simultaneously relieved, and the bowels respond readily to laxatives or may even act spontaneously. Should there be obstinate constipation and the cathartics indicated above prove inefficacious, croton oil, 1 drop daily in thick barley-water, as recommended by Des Planches, may be administered. Should there be persistent vomiting, it will be relieved by giving bits of broken ice or may be controlled by hypodermic injections of morphine. Alum in doses of 15 to 30 grains every four or five hours has proved of unquestioned value in colica pictonum. Alum-whey[1] may be substituted, a wine-glass every hour or so.

In addition to the constitutional remedies indicated, arthralgia when it occurs may be treated by the local application of galvanism and hot fomentations and sinapisms.

When muscular paralysis and atrophy occur in lead-poisoning the most useful agent is electricity. In the degenerative (neuritic) type galvanism as a rule is the only form of electricity in any way serviceable; the faradic is utterly useless, there being, as is well known, no response to this current when the reaction of degeneration is present. There are, however, exceptional cases in which the neuritis is so mild in character as not to destroy entirely the integrity of the nerve-fibres, thus allowing the conduction by them of trophic influences to the muscles from the multipolar ganglionic cells of the anterior cornua; and in such cases the faradic current may be employed to advantage. The muscles should be systematically stimulated until regeneration of the nervous elements has taken place. Muscular wasting is thus prevented and a more perfect recovery ensured. In the primary atrophic (myelitic) type the induced current may be used; the amount of benefit that will be received from this treatment, however, is uncertain, as it depends upon the degree of the lesion of the spinal cord. Massage and Swedish movements are valuable adjuvants in the treatment of lead-palsies. The use of strychnine is of great value; its hypodermic use is in no way to be preferred to the more ordinary method of administration. Dr. H. C. Wood emphasizes the extraordinary power which it possesses over saturnine paralysis, but

[1] Bartholow, *Materia Medica and Therapeutics*, p. 241.

advises that it should never be administered in the same prescription with iodide of potassium.

There can be no doubt as to the value of a suitable prothetic apparatus as an aid to recovery in "wrist-drop." The hand by its use is kept in a position of extension, thus resting the paralyzed muscles, and preventing as well contraction and overstretching of the flexors. A somewhat elaborate and in every way admirable appliance is that devised by Dr. Hudson. "It is very light and beautiful, and is worn without inconvenience, enables the patient to exercise the muscles of the hand and fingers constantly, and thus materially facilitates nutrition and development."[1] Dr. V. P. Gibney recommends the use of an instrument by means of which the hand may be hyperextended to its fullest possible limit, and reports very good results from its use.[2] The use of prothetic appliances should not be discontinued until recovery has practically been assured.

Nitrite of amyl has proved very useful in the hands of Oliver in acute lead encephalopathy. It lessens the pulse, wards off convulsions, and greatly relieves the arterial tension. The prompt exhibition of pilocarpine may prevent a fatal termination should a suppression of urine develop. Palsy of the eye-muscles due to paralysis of the third nerve should be treated after the manner advised by Buzzard. A constant current slowly interrupted should be used in the following manner: A well-wetted plate reaphore is applied to the nape of the patient's neck and connected with one pole of the galvanic battery. The physician should take the other pole, well wetted, in his left hand, grasping the metallic portion in his palm, and applying the current to the patient's eye with the index finger of his right hand, which should be covered with one thickness of muslin well moistened, the conjunctiva having first been rendered insensible by the application of a 2 per cent. solution of hydrochlorate of cocaine. The strength of current employed should be from one and a half to two milliampères. The making and breaking of the circuit is produced by the alternate application and lifting of the finger. Applications should also be made to the upper lid and the conjunctiva as nearly as possible to the insertion of the ocular muscles; the time occupied should not exceed three minutes. Dr. Buzzard does not think that there is any benefit to be derived from the current as usually employed through the closed lids.[3]

Should atrophy of the optic nerve result from optic neuritis, the treatment which yields the best results is the application of "voltaic

[1] *Orthopædic Surgery and Disease of the Joints*, Lewis A. Sayre, M. D., p. 532.

[2] *Medical Record*, Nov. 2, 1889.

[3] "Complete Paralysis of the Right Third Nerve in a Patient affected with Lead-Palsy; Recovery under the Direct Application of the Galvanic Current," *Brain*, Part l., 1890, p. 228.

alternatives" in conjunction with the hypodermic injection of strychnine in the temples. In optic atrophy this treatment has given me surprising results.

The morbid arterial, cardiac, neurasthenic, and hysterical states that may be set up by lead-poisoning and outlast their cause should receive the treatment appropriate for each of these diseased conditions.

# CEREBRAL CONCUSSION AND SHOCK.

By JOSEPH RANSOHOFF, M. D., F. R. C. S., Eng.

## CEREBRAL CONCUSSION.

A certain number of the many and varied symptoms which follow injuries of the head of greater or less severity often group themselves together to constitute the clinical picture of cerebral concussion. As a bedside feature it was first accurately described by Borel in 1677. However imperfectly understood the pathological conditions underlying the symptoms may be, and however hypothetical the explanations advanced of their mechanism, there can be no question that from a clinical standpoint cerebral concussion or shock, *commotio cerebri*, exists as an entity. The force producing it, as a rule, is applied to or distributed over a large area, as by impact with blunt objects or by falls. Without damaging the cranium it may spend itself on the cranial contents. Therefore the subsequent gravity of the trauma bears no invariable relation to the extent of the primary shock. In the very gravest cases the shock may be entirely absent.

Depressed fractures of the skull and penetrating wounds are often associated with less shock than are seemingly more trivial injuries in which the brain as a whole is primarily involved. Quite recently I saw two illustrative cases—one with Dr. Jenkins of Newport, the other with Dr. Berry of Fairmount. The first was that of a boy seventeen years of age who had been struck with a cleaver: over the left frontal region there was an incised and depressed fracture of the skull with penetration of the dura. There was not even momentary concussion, the boy starting on a two-mile walk immediately after the injury was inflicted. The second was a pistol-shot wound of the skull which penetrated the left frontal lobe, producing paraphasia. The skull was fractured, the dura perforated, the brain-substance oozing from the wound when the trephine was applied; yet there was no concussion.

Among the accidents followed by brain-shock, falls take a foremost place. The height need not be very great; often it is only a few feet, the momentum at the instant of impact being of greater importance than the distance. If great mental perturbation, as from fright, has preceded the fall, the effects of the concussion appear accentuated. Indeed, it is probable that the emotion mentioned is capable of producing the clinical

manifestations of cerebral shock without physical influences of any kind. During the Cincinnati riots of 1884, I was called to see a gentleman with a gunshot injury of the hip. When I arrived on the scene I found a man pale, bathed in perspiration, pulse scarcely perceptible, and muttering incoherently. I believed him to be the seriously injured one, yet he had not been touched. The firing of the musketry had shocked him more than had the gunshot injury the companion with whom he had been walking.

The effects of the combined influences of the psychical and physical causes of shock are well illustrated by cases in which individuals are thrown from horses or vehicles. Here the symptoms are more pronounced than in cases in which the sensorium was unruffled at the moment the shock was sustained. The fact accepted by clinicians that individuals under the influence of alcohol are less liable to concussion from injury, other things being equal, corroborates the idea intended to be conveyed.

Except in very rare cases the force producing cerebral concussion is applied to the head, and generally the symptoms are commensurate with the degree of the violence. Sometimes, however, such trivial forces as a blow from a fist or butting against an object in the dark are followed by alarming symptoms of concussion. Occasionally cases are recorded in which even a fatal shock is indirectly produced by falls on the buttocks, the feet, or the knees, the force being transmitted the length of spine, the cranium and its contents presenting no discernible lesions. Such cases should always be carefully scrutinized, for in most of them the autopsy will reveal the presence of extensive intra-abdominal or thoracic damage not recognized during life.

**Symptoms.**—Presuming for the moment that cerebral concussion is the effect of vibrations imparted by the cranium to the brain, including the medulla, as a whole, it is evident that the symptoms which may be said to be typical of it must vary in degree within very wide limits, even in pure cases, and that very often the clinical picture is changed or entirely effaced by the development of secondary and generally greater intracranial lesions. The rapidity with which this effacement sometimes ensues has led to the belief that concussion is not at all present in some injuries which diffusely affect the brain and are rapidly fatal, such as fracture of the base. Yet symptoms of shock are probably always present, though they may be of such short duration that they are not seen by the surgeon.

In 1881, I saw a girl of fourteen fall from a second-story window to the pavement. Within a minute I was at her side. There was absolute unconsciousness; pulse feeble and flickering; respirations shallow; pupils contracted; face of deathly pallor. Within ten minutes reaction had set in; the pulse became full and slow, color

returned to the face and warmth to the body. Then a bluish spot appeared over the left eyelid; it extended to the conjunctiva, and became deeper in color with each minute. Respiration became stertorous; the pupils, which had been contracted, were now dilated. The symptoms of compression from basal fracture had supplanted those of concussion. The girl died on the fourth day. The autopsy made by Dr. Zinke revealed a very extensive basal fracture. "The brain itself betrayed no sign of injury or disease, so far as could be determined by macroscopic inspection." The symptoms of concussion were clear until hæmorrhage sufficient to produce compression had taken place.

Following the lead of Dupuytren, most systematic writers classify cases of cerebral concussion according to their severity into the mild, the grave, and the gravest. Such a division is warranted only in the most general way. Hard and fast lines cannot be drawn, since apparently trivial cases may prove fatal through their sequelæ, and cases primarily grave are often followed by surprisingly speedy and complete recovery.

The chief symptom of cerebral concussion is found in perturbation or complete abeyance of consciousness. In the mildest cases, such as follow a light blow on the forehead, it is momentary: the individual does not even fall. There is slight giddiness, and loss of vision, with or without flashes of light before the eyes. Rushing noises may be heard; there is slight bewilderment; a few incoherent words may be uttered, and the mental equilibrium is again restored. In somewhat severer cases the impairment of the sensorium is more prolonged and profound, and there are evidences of involvement of the cardiac and respiratory centres as well as of the gray matter of the cortex. The pulse is small, felt with difficulty, and usually reduced to fifty or sixty beats per minute. In accord with this lowered tone of the circulation are the blanched face and lips. Respirations are shallow and decreased in number. Often they are irregular and sighing. The muscular system is thoroughly relaxed, and the patient lies in the position in which he has fallen. The loss of consciousness is not complete. By rousing the patient, incoherent, usually monosyllabic, answers can be obtained. This condition may last from a few minutes to an hour or two, or even longer, when recovery ensues, often with great rapidity. The regularity of respiration is re-established; the pulse increases in volume and frequency; the color returns to the face and consciousness is restored. A tottering gait often characterizes the first effort at walking, and severe headache may be complained of.

In concussions of slighter degree the entire picture may pass off in less than an hour and the patient resume his usual vocation. In very exceptional cases motor disturbances supervene toward the end. Twitching of the ocular and facial muscles is observed. In one instance I

saw a general epileptiform seizure occur in the ordinary course of a concussion. The patient, a very healthy adult, in avoiding a passing vehicle slipped and fell, the occiput striking the curb. The usual symptoms of concussion, which had lasted for an hour, were followed by a general convulsion of several minutes' duration. When he came out of this the patient roused himself and insisted on walking to his home several miles away. He had no other convulsions, nor has he since experienced any ill effects from the accident sustained four years ago.

Not so fortunate always is the end of even mild cases of cerebral shock. In not a few disturbances of articulation, paraphasia, stammering, facial or ocular paralysis, follow and may continue for many months. The intellect is weaker, and the capacity for work is often greatly diminished. There is sleeplessness and loss in body-weight. Diabetes insipidus and mellitus often follow, and although they are generally transitory, like glycosuria physiologically produced, they may continue for years. Such a case I saw recently. The urine had remained saccharine for three years following concussion sustained in a railway accident. The scalp was cut by a piece of glass. A month before the injury was inflicted the patient was examined for life insurance by several physicians, who found the urine normal.

In the graver forms of cerebral concussion, as in those above described, the loss of consciousness immediately follows the accident. Without a cry the patient sinks to the ground completely relaxed; the feeble pulse and shallow respirations are the only evidences of life; the loss of consciousness is complete, for neither through the special senses nor by cutaneous irritation is it possible to obtain a reflex contraction. Boyer cites the case of a woman who gave birth to a child while suffering from cerebral shock. When she awoke from her lethargy she was ignorant of what had occurred. In such grave cases the face is of a deathly pallor and bathed in clammy sweat. The body-temperature is lowered two, or even three, degrees. The pupils are generally unevenly contracted, but at all events sluggish to react. Urine and fæces are voided involuntarily. Sometimes there is vesical retention. If the injury was sustained after the ingestion of a full meal, free emesis may indicate beginning reaction. Deglutition is performed easily when food is introduced beyond the mouth. According to Gross, bleeding from the nose is not an uncommon symptom in severe cases, and hæmorrhage from the ear may occur without basal fracture.

It is characteristic of the symptoms of concussion of every degree of severity that they are most pronounced immediately after the accident, and that the general tendency is toward amelioration. Although, as will be seen later, many of the symptoms detailed are produced by recognizable lesions, and are therefore not the result of concussion

alone, it may be considered certain that any exacerbation of them is invariably the result of some additional complicating factor, such as contusion, hæmorrhage, or inflammatory exudation. So in grave cases the unconsciousness, muscular relaxation, or depression of cardiac and respiratory centres may last for several hours, and even days, when, if complications do not ensue, the progress toward recovery is made manifest. The sopor becomes less profound, and one is enabled to get some response. Occasional voluntary movements of the extremities are made, and by signs the patient expresses his desire to void urine or fæces. Pulse and respiration become normal, and often the former surpasses the normal limit both as to frequency and fulness. More and more easily the patient can be roused from his lethargy. Answers are more readily obtained and become more rational. Gradually the mental hebetude disappears, and restitution to the norm ensues in from one to ten days, according to the gravity of the case.

Whenever the clinical history is protracted beyond a few days it is probable that the symptoms of concussion have made way for those of coarser lesions. Abernethy, with his usual clinical acumen, divided the symptoms of concussion into three periods. The first is characterized by unconsciousness; the second, by return of intelligence; and the third, by return to health. There are yet other cases of cerebral concussion in which the shock to the cardiac and respiratory centres is so violent that death is almost instantaneous or follows in from several minutes to an hour or two, consciousness never returning. The researches of Prescott Hewitt and others have shown that such cases are much rarer than was formerly supposed, and that in the great majority of cases presumed to be of this nature there are gross lesions, such as contusion or laceration of the brain, hæmorrhages into the spinal canal which are readily overlooked, or fatal visceral lesions like cardiac rupture or laceration of abdominal organs. Nevertheless, medico-legal inquiry every now and then reveals death from cerebral concussion alone.

The following is a case that came under my observation, Dr. Kebler making the judicial autopsy: A man of forty years, who was a moderate drinker, but of excellent health, to escape the heat of a crowded tenement left his room toward morning to seek rest on a lumber-pile eight or ten feet high. Several hours later he was found dead on the ground, evidently having fallen from his improvised couch while asleep. The autopsy revealed nothing but a contusion of the scalp which extended to the pericranium. There was no fracture, nor was there any bruising of the cerebral cortex. The vessels of the pia appeared greatly dilated, the puncta vasculosa seemed larger than normal, and the bleeding from the divided dural sinuses seemed more copious. It is probable that the dependent position in which the head was found,

and had remained after the accident, to no inconsiderable extent was accountable for the increased vascularity of the brain and meninges. Nothing was found in the thoracic or abdominal organs to account for death.

Bergmann also reports two cases judicially investigated, and for the thoroughness of the autopsies he vouches: A boy of two years, in perfect health, was put to bed by his mother. Half an hour later he was found dead on the floor. On the forehead and on the vertex were found two contusions three-fourths of an inch in diameter. Neither in the meninges nor in the brain were any changes discernible, with the exception of marked injection of the vessels of the pia, the choroid plexuses, and the serous lining of the ventricles. The latter contained half an ounce of serum; the sinuses, fluid blood. The other organs were normal. A peasant-youth aged fourteen was found on the road-side near a sleigh which he had been seen driving several hours before. He had been in perfect health. The official investigation revealed two semicircular excoriations nearly two inches long and half an inch wide —one below the right orbit, the other on the left side of the lower jaw. Beneath the latter blood-extravasation extended to the bone; beneath the former, only through the subcutaneous cellular tissue. There were smaller superficial suggillations in the right temporal region, over the sternum, and about the legs. On the deep surface of the scalp, at a point corresponding to the right frontal eminence, were two extravasations as large as a dime. The integument was unbroken. The dura was tense, the vessels were injected, and the sinuses distended. The cerebral convolutions were flattened, rather soft in consistence, and contained within many puncta vasculosa. The vessels of the ventricular walls were strikingly distended. Each of the lateral ventricles contained an ounce of reddish serum. With the exception of hyperæmia of the lungs nothing noteworthy was found in the other organs.

In each of these cases death resulted from head injury in healthy individuals. Yet no marked lesions were found, unless the injection of the vessels of the pia and the presence of reddish serum in the ventricles be so considered. The degree of injection is always relative. It is found in cases in which the cause of death is far removed from the cranium. It may result from dependence of the head after death. To consider it a "lesion of cerebral shock" does not seem warranted. Therefore it seems certain that death can result from concussion uncomplicated by what must be regarded its more common causes—contusion, laceration, or exudations hæmorrhagic or inflammatory in nature.

The possibility of a fatal issue to brain-shock appears of paramount medico-legal importance, in view of the tendency of recent writers to call it in question. The view expressed is substantiated by the fact

that cerebral embolism is often attended with some of the symptoms of brain-shock, although the circulation of only a limited area is temporarily involved.

**Differential Diagnosis.**—The symptoms of cerebral concussion are often followed by or blended with those of other conditions, from which it should be distinguished. Particularly important is the diagnosis between concussion and compression of traumatic origin. The one *per se* never requires surgical interference; the other is often amenable to it. Indeed, every case of compression in the light of modern surgery suggests the possibility of relief by operation. While concussion lasts operations are generally contraindicated. For this reason I deem it wise to adopt parallel columns to bring into prominence the chief points in differential diagnosis, and to make use of Agnew's table as modified by Corley:

| Concussion. | Compression. |
|---|---|
| Unconsciousness is incomplete; patient can be made to answer, though it may be briefly and in simple words. | Complete unconsciousness; may scream into patient's ear at the top of the voice, but will receive no answer. |
| Special senses, though greatly blunted, are not abolished. | Special senses entirely suspended. |
| Power of movement not destroyed; if the position of a limb be changed, the patient will resist or bring it immediately into the original position. | Complete or partial paralysis; in most cases hemiplegia. |

The compression in this table is that which is general and affects the brain as a whole. Such compression might result from a subdural clot or extensive basal effusion. There is in addition the more limited lesion, which, without at any time having produced symptoms of general compression, or if so after these have subsided, makes itself manifest by monoplegia or monospasm. Such a case presented itself in the surgical ward of the Cincinnati Hospital several years ago: A robust adult was struck with a shovel on the right side of the head. He sank to the ground in collapse. When brought to the ward reaction had taken place. He was in a condition of sopor, from which he could be roused. Some incoherent muttering was noted. Pressure over the right parietal eminence was painful and elicited a cry. There was very marked paresis of the lower portion of the left side of the face. No fracture could be detected. Urine had to be removed with a catheter. The patient continued in this condition for four days, when a gradual improvement in the mental condition was noticed. In two weeks the facial palsy had also disappeared, and the patient was discharged well. Here there were added to the symptoms of concussion those of localized cerebral compression from hæmorrhage into or on the surface of the cerebral convolutions. The chronological sequence of

symptoms from shortly after the onset to recovery is satisfactorily accounted for in this manner, the reasoning being justified by what is known of the absorption of blood-clots in other parts and tissues of the body.

In another class of cases the symptoms of compression do not follow until the patient has almost or entirely recovered from the concussion. They are cases which often bring uncalled-for censure on resident hospital surgeons. An individual receives a fall or blow on the head. The symptoms of shock disappear after a few hours. The patient is dismissed from observation, often at his own request. Several hours later he may be returned to the hospital with all the evidences of compression from a hæmorrhage from a ruptured middle meningeal or other artery. Here the differential diagnosis is established by the presence of an interval of lucidity in the clinical history—an interval which may vary in length from several minutes to eight days.

### Cerebral Irritation.

Among cases of concussion and contusion one will occasionally be encountered in which, after a partial return to consciousness and normal cerebration, convalescence is arrested, the patient presenting a characteristic mental and physical condition. Though observed by older writers, Erichsen was the first to direct special attention to it and give it the name of cerebral irritation. His description so perfectly portrays what I have seen a number of times that I present it in full: "The attitude of the patient is peculiar and most characteristic: he lies on the side and is curled up in a state of general flexion. The body is bent forward, the knees are drawn up on the abdomen, the legs bent, the arms flexed, and the hands drawn in. He does not lie motionless, but is restless, and often when irritated tosses himself about. But, however restless he may be, he never stretches himself out nor assumes the supine position, but invariably reverts to the attitude of flexion. The eyelids are firmly closed, and he resists violently every effort to open them. If this be effected the pupils will be found contracted. The surface is pale and cool, or even cold. There is no heat of head. The pulse is small, feeble, and slow, seldom over seventy. The sphincters are not usually affected, and the patient will pass urine when the bladder requires to be emptied. There may, however, though rarely, be retention. The mental state is equally peculiar. Irritability of mind is the prevailing characteristic. The patient is unconscious, taking no heed of what passes unless called to in a loud tone of voice, when he shows signs of irritability of temper, or frowns, turns away hastily, mutters indistinctly, and grinds his teeth. It appears as if the temper as much as or more than the intellect were affected in this condition. He sleeps without stertor."

The recovery which follows is usually tedious; many days and weeks, even months, may pass before the mental equilibrium is restored. In not a few cases entire recovery never ensues, evidences of mental weakness continuing throughout life. Peculiarities which existed before the accident are accentuated. Sometimes cerebral irritation is followed by temporary or even permanent insanity. In the case of a young girl of eighteen whom I saw in Longview Asylum for the Insane melancholia followed this condition. The cerebral irritation followed the concussion produced by a blow on the temple from a mallet. The concussion was very mild, but the symptoms of irritation were marked for nearly four weeks. A period of mental fatuity followed. It was only after the patient began to walk about that the signs of the psychosis were marked. She remained in the asylum about six months, when she was discharged cured. More than a year has passed since, but there has been no recurrence of her symptoms.

Injuries of the head are not infrequently followed by mental impairment without the intervention of cerebral irritation. The degree of mental disease is not commensurate to the severity of the injury. Simple concussion is as often causative of insanity as fracture. According to Kraft-Ebbing, such cases of insanity may be divided into three groups: 1. The psychosis is the direct result of the trauma. The patient becomes weak-minded, even imbecile. Frequently there follow disturbances of co-ordination, or paralysis. The anatomical change found in these cases is a molecular degeneration of the cortical cells following inflammation of the cortex and the meninges. 2. The psychosis is preceded by prodromata affecting chiefly the sensibility. There is marked excitability: the patient is moody, and a change is noted in his character. Maniacal attacks often supervene, and are followed in turn by progressive paralysis with total loss of mentality. The causative importance of cranial injuries in relation to progressive paralysis of the insane is apparent from the tabulation of 76 cases by Meyer, in 15 of which trauma is given as the immediate cause. 3. In this class of cases the injury must be considered as a predisposing influence toward insanity, in that the latter does not develop until one of its more common causes is inflicted on a cortex impaired in nutrition by a trauma.

Another condition, at times difficult to distinguish from concussion with or without contusion, is traumatic inflammation of the brain and its meninges which often speedily follows the shock. In the light of the now generally accepted views of the causes of inflammation it is easy to comprehend how this process follows brain-injuries complicated by wounds of the enveloping soft parts or by fracture. In fractures of the base two infections may result through rents in the

membrana tympani, the roof of the nose, or pharyngeal vault. When there is suppuration in other parts of the body we can also explain the existence of intracranial suppuration after cranial injuries uncomplicated by external wounds. But in cases of simple concussion a high grade of inflammation, even if it be not suppurative, often follows the shock after a few hours or days. The very great vascularity of the pia after concussion fully accounts for the clinical fact that inflammation so speedily follows the former, at first masking the symptoms, soon to supplant them completely. What appears to be a normal reaction passes into the pathological condition of inflammation.

Several years ago a girl of seventeen years suffered a very severe cerebral concussion in an inclined-plane accident. When I first saw her consciousness was completely lost. The temperature was 96° F., and continued below normal for nearly two days. There was no paralysis, nor were there any convulsions, general or local, to indicate contusion. Other injuries sustained were a simple fracture of the leg, a very slight cut at the angle of the mouth, and another of the eyebrow. The symptoms of shock continued during two days, when reaction came on. Consciousness did not return with it. The temperature was normal for only a few hours, but rose rapidly to 101° or 102° F. in the morning and 103° or 104° F. in the evening. The pulse became hard and very rapid, the face flushed. The patient, who during forty-eight hours after the injury was quiet, with muscles relaxed, became restless in the extreme. It was difficult to fix the fractured limb. While concussion lasted not a word escaped her; now she was sleepless, at times wildly delirious and difficult to restrain. Vesical incontinence, present during the first days, gave way to retention, which made catheterization indispensable for weeks. The tongue became coated, the bowels constipated and moved only by active purgatives. Although the inflammatory process involved a large cerebral surface, nothing of a localized nature developed. Under the use of the continuous ice-douche, blisters to the nucha, active purgation, and enough opium to quiet her, complete recovery ensued.

The rapidity with which the concussion in this case was followed by inflammation, and the intensity of the symptoms from the start, are not unusual. In many cases, however, from three to five or more days elapse before this sequel makes itself manifest. The longer the interval of quiescence the more insidious in its onset is the inflammatory process. The patient may have believed himself entirely recovered from his injury for a number of days, possibly weeks. Then he feels a general malaise; he has headache and is restless at night. Possibly dreams disturb his sleep. There may be vertigo and some vomiting. He is forced to take to his bed. Rapid pulse, elevated temperature, and delirium follow. The complete picture of traumatic cerebral

inflammation is *en scene*, and is shifted through the various phases of paralysis, convulsions, and coma until death comes.

SHOCK.—A condition often contrasted with cerebral concussion is that of general concussion or shock following injury to other parts than the head and its contents. It is essentially a reflex paresis of the vascular system, and chiefly of the heart, consequent on a profound and violent impression made on the nervous system. Sudden and destructive injuries causing lacerations of a limb are among the most common causes of shock. But profound mental impressions without physical injury are also at times followed by it. As in cases of cerebral concussion, there is great depression of the vascular system. The temperature is subnormal. The face and extremities are cold, and beads of perspiration cover the skin. The respirations are short and frequent, the pulse rapid and feeble. As in cerebral shock, there is often vomiting attended by fæcal incontinence. There are in both great muscular debility and relaxation of the extremities. But the chief clinical feature of cerebral concussion, the insensibility, is absent in cases of general shock. In the latter condition the evidences of life may be feeble in the extreme, the pulse scarcely or not at all perceptible, the respirations irregular; but consciousness is present and cerebration is normal, so far as it is compatible with the enfeebled circulation. The patient may be confused in general shock, but a sharp question will arouse him and bring forth a rational answer. In some cases the intellect appears to be even stimulated, and the mind preternaturally clear. The patient converses rationally to within a few moments of his death. With this cardinal feature of general shock in mind there ought never to be any difficulty in distinguishing it from cerebral concussion.

Among the sequelæ of concussion of considerable medico-legal importance is the impairment of memory. As a rule, in the graver forms the patient cannot recall the manner in which the accident occurred. Frequently the mental pictures antedating the injury by hours, or even days have been entirely obliterated. In a carriage accident recently seen the patient, a young lady, was unable to recall anything that had occurred that day. She did not remember that her carriage had been struck by a locomotive, that she was coming from church at the time, and that she had a companion in misfortune who had called for her early in the morning and been with her during the service. In not a few cases in which the patient was subsequently enabled to give a detailed account of an accident I have felt certain that it was a recital of what had been learned from hearsay, and not of impressions received at the time. Mental impressions repeated daily and for years may be obliterated by cerebral shock. Medical literature is replete with cases of loss of memory from it. Friends are forgotten. The wife does not remember that she has children or is married.

Accomplishments, such as music and the knowledge of languages, are lost; indeed, results of years of education may be swept away and the mind left a *tabula rasa* for new impressions. It is well to bear in mind that, whereas such results are more commonly seen after cerebral concussion, they may also occur after general shock or after recovery from the collapse accompanying severe hæmorrhages.

**Pathology.**—When death follows upon cerebral concussion or any of its sequelæ the anatomical changes found within the cranium will vary according to the degree of violence inflicted and the duration of life afterward. As has already been stated, cases are occasionally encountered in which there are no visible lesions in the brain or meninges, except more or less marked vascularization of the meninges, resulting from paresis of the blood-vessel walls. As a direct result of this the presence of more or less sero-sanguineous fluid will sometimes be observed in the ventricles and subarachnoidean spaces. In yet another class of cases the thin-walled terminal vessels passing through the medullary portions of the brain will have ruptured in many places, leaving minute hæmorrhages distributed through the white substance. They are the miliary apoplexies of Nélaton and Rokitansky. The presence of a blood-clot, however small, readily permits this condition to be distinguished from mere dilatation of the normal puncta vasculosa. In very many cases of concussion the autopsy reveals numerous extravasations of blood within the cortex or beneath the pia. The brain in these places presents a contused or bruised appearance if death occurred shortly after the accident. After several days or weeks a more grumous appearance is found. Such extravasations occur at a point corresponding to that of impact or to one diametrically opposite. Very often, however, the extravasations are found at remote points. Not all parts of the cortex and pia are alike subject to extravasation. The frontal and spheno-temporal lobes are more frequently involved, and here again the extravasations are found oftener on the inferior than the superior surfaces. The osseous and membranous projections from the floor of the anterior and middle cranial fossæ will explain the more frequent ecchymoses in parts of the brain contiguous to them. The occipital lobe resting on the tentorium is comparatively safe from severe impact. Without great damage to the brain-substance submeningeal extravasations covering large areas are sometimes seen. As the extravasation takes place the pia is lifted from the underlying cortex, until an entire lobe may present the appearance of a massive blood-coagulum. On stripping off the pia the convolutions may present nothing abnormal except flattening. Death in these cases usually ensues with the symptoms of compression.

Langier believed that the violence of concussion spent itself on the cortex. The implication of the heart and respiratory centres as seen

during life militates against this doctrine. It is true that visible lesions in the medulla and pons are not often found; but they do occur: Agnew reports such an instance of extravasation into the medulla oblongata. The prominent symptom was irregular and difficult respiration.

Associated at times with depressed fractures of the vault, or oftener with complicated and extensive lesions of the base, the brain is found lacerated. Extending through the thickness of a convolution or far into the white substance will be found a rent more or less filled with a hæmorrhagic extravasation, and clearly to be seen only when this is removed under a jet of water. In these cases the symptoms of concussion may, as already explained, have been entirely overlooked on account of the rapidity with which they were followed by those indicative of contusion, hæmorrhage, and compression.

The anatomical data obtained in fatal cases of cerebral concussion throw but little light on the method and mechanism of its production. Whether it is the result of molecular vibrations of the cells of the cortex on each other, or of vibration of the brain-mass as a whole within the cranial walls, is at yet unknown. Experiment has been of little or no service in solving this part of the question. The absence of gross lesions in undoubted cases would seem to show that molecular changes are the cause, whereas the contusions more frequently found would indicate that the brain as a whole is violently jolted by or against the firmer structures receiving the brunt of the blow. Stromeyer believed that a temporary compression thus produced would explain the symptoms of concussion, and particularly those cases in which the symptoms rapidly disappeared. This explanation is unsatisfactory, since the long-continuance of symptoms is incompatible with temporary compression. The coma following compression is relieved at once by the removal of the clot which produces it. The view of Fischer, that the symptoms and lesions of brain-shock are the result of paralysis of the vessels of the pia, most satisfactorily accounts for both. Paresis of the arterial walls followed by secondary venous distension produces such diffuse disturbances of nutrition of the cortex and of the cardiac and respiratory centres that their functions are to a very large extent interfered with. The experiments of Koch and Filehne, in which by repeated light blows they were able to produce symptoms of concussion, and even death, without gross cerebral lesions, go far toward establishing this doctrine of the vaso-motor paralysis as the essential feature of brain shock.

**Treatment.**—The tendency of cerebral concussion is toward recovery. In very many cases its manifestations have passed away before surgical assistance arrives. When seen during the period of depression it is not always wise to interfere actively. The natural desire to combat depressions by active stimulation ought to be resisted. Placing the

patient in a horizontal position, loosening the garments to facilitate respiration, the application of dry heat to the extremities, and friction of the skin, will, as a rule, be sufficient to tide the patient over the period of depression. When it becomes apparent that the means named are insufficient, diffusible cardiac stimulants must be administered, but sparingly, lest when reaction ensues it be excessive. The exhibition of stimulants by the mouth is not always feasible. Often the patient cannot be made to swallow, and the presence of fluids in the pharynx becomes an additional source of danger by impeding respiration. Enemata of hot water containing an ounce or two of whiskey can always be given with little trouble. If the heart's action still remains feeble, hypodermic injections of ether, of a drop of 1 per cent. solution of nitro-glycerin, or of camphor—10 per cent. solution in olive oil—may be administered with much benefit. As soon as reaction comes on such medication should cease. The return of color to the face, the awakening to consciousness, or vomiting should put an end to stimulating treatment. In cases in which the unconsciousness from concussion or contusion continues for many hours, the condition of the bladder must be watched. While depression continues the renal secretion is greatly diminished; nevertheless, it is wise to use the catheter to prevent hyperdistension of the bladder.

When reaction has set in the therapeutic indication is to keep it within physiological bounds. Absolute rest of body and mind is to be insisted on, and where the concussion has been severe it is always wise to keep the patient in bed and on a low diet for a number of days, or even weeks. In this connection I deem it wise to point out the necessity of strict aseptic treatment of whatever open wounds the patient may have sustained about the head or other part of the body by the accident. Should symptoms of meningeal inflammation supervene, they are to be met by the continuous ice-douche, leeches, and purgation on general therapeutic principles. For concussion operative interference is not called for. For this reason the surgeon should most carefully watch his patient to detect in their beginning evidences of the many conditions which follow cerebral shock, and which can be relieved only by operative measures.

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## SHOCK.

Shock may be defined as a relaxation or abolition of the sustaining and controlling influence which the nervous system exercises over the vital organic functions of the body. It is the result of a profound impression made on the cerebro-spinal axis, either directly, through the

agency of an afferent nerve, or through the circulatory medium. A blow on the head or a severe fright, the mangling of a limb, and the ingestion of certain violent poisons are equally capable of producing shock, and in each case it is made manifest by more or less depression of the vital processes, notably of that of the circulation. According to the nature of its cause, shock must be considered as a reflex phenomenon or as the immediate effect of a physical or toxic injury to the cerebrum or its large basal ganglia. An overwhelming majority of cases, including those of traumatic and psychic origin, belong to the former category; a small minority to the direct variety.

The causes of shock may be divided into—1. The traumatic; 2. The psychic or emotional; 3. The toxic. In not a few cases a combination of these causes is active in the production of shock.

Every trauma, however slight, may be followed by shock. Incised and contused wounds, fractures, subcutaneous or compound, gunshot wounds, burns, scalds, the mangling of limbs, and exposure to extreme cold may be cited as among the most frequent precursors of surgical shock.

As a rule, the severity of shock is proportionate to the extent of the injury. A compound fracture is followed by severer shock than a simple one; the crushing of a limb by greater shock than either. Injuries to the lower extremities are always productive of severer shock than are similar injuries to the upper extremities. Mangling of the upper extremity is generally followed by little shock. The nearer the injury approaches the trunk, the graver is the attendant depression. The opening of large joints and the penetration of the great cavities of the body are among the most fruitful causes of shock that is often rapidly fatal. The method of infliction of the trauma is an important element in determining the degree of shock produced. A fall from a height of twenty feet will be followed by greater shock than one from two or three feet, though in either case the lesion may be but a simple fracture. The shock observed after railway accidents is greater than that from other injuries, the local damage being the same. As in cases of cerebral concussion, the consciousness that an accident was impending largely influences the degree of the shock which follows it. The soldier in the heat of battle or the brawler in a street-fight does not know that he is wounded until he sees or feels the blood. Quite recently a man was brought into the surgical ward of a hospital with eight feet of intestine hanging from an abdominal wound. The shock was so slight that it required the combined strength of a number of officers to restrain him from pursuing his aggressor. Great dread, on the other hand, accentuates shock. Several years ago a man in robust health was brought into the wards of the Cincinnati Hospital. He had fallen into a bear-pit and had been clawed. The wound was superficial,

extending from the shoulder to the wrist. He died in thirty hours from shock. The autopsy revealed absolutely normal viscera.

In illustration of the etiological importance of fear or terror in the production of shock the case reported by Brunton will bear quotation: "Many years ago the janitor of a college had rendered himself in some way obnoxious to the students, and they determined to punish him. They accordingly prepared a block and axe, which they conveyed to a lonely place, and, having dressed themselves in black, some of them prepared to act as judges and sent others of their company to bring him before them. When he saw the preparations that had been made he at first affected to treat the whole thing as a joke, but was solemnly assured by the students that they meant it in real earnest. He was told to prepare for immediate death, for they were going to behead him then and there. The trembling janitor looked all around in the vain hope of seeing some indication that nothing was really meant, but stern looks everywhere met him, and one of the students proceeded to blindfold him. The poor man was made to kneel before the block; the executioner's axe was raised; instead of a sharp edge, a wet towel was brought smartly down on the back of the culprit's neck. This was all that the students meant to do, and, thinking that they had frightened the janitor sufficiently, they undid the bandage which covered his eyes. To their astonishment and horror they found that he was dead."

The violence producing traumatic shock is ordinarily of momentary duration. Comparatively slight injury often repeated may likewise produce it. Death from flogging was not of infrequent occurrence in England a few decades ago. The culprit being tied to a post in a perpendicular position, shock was great. In a case recently witnessed in Siberia the pulse at the end of the operation was 120 and very weak, the temperature 99.5°.

To the purely traumatic causes of shock from the application of physical force from without must be added those that have their origin within the body. It may follow rupture of an aneurism, the impaction of a renal or biliary calculus, perforation of the stomach or intestine, or the plugging of a cerebral artery.

In cases of burns and scalds the degree of the shock depends more on the extent of skin involved and on the site of the burn than on its depth. Burns of the first degree affecting a large area, particularly of the trunk, are often followed by fatal shock. Such an injury to the genitalia, though limited in area, is also often followed by great shock.

Surgical operations are largely influential in the production of shock. The introduction of a sound into the urethra has been followed by death in a few hours, and the introduction of a needle into a pleura filled with fluid has been followed by immediate death. So has

the opening of an abscess of the finger. Prolonged operations attended with considerable loss of blood, the exposure of large wound-surfaces or of serous sacs to the air, are often followed by grave shock. While anæsthesia modifies shock, it does not abate it. As the saw cuts through the bone in an amputation the breathing often becomes stertorous, and there is an acceleration of the pulse as a reflex indication of shock during profound anæsthesia. During castration a like phenomenon is observed when the ligature is tightened around the cord. In pre-anæsthetic days death at this moment occasionally supervened. In tracheotomy death often results the moment the trachea is incised.

Psychical causes so often produce an evanescent depression of the circulation that, within rather wide limits, the result may be said to be physiological. Where the physiological yields to the pathological state cannot be determined. Excessive joy or grief, anger and fear, may give rise to prostration varying in severity like that of traumatic origin. Relaxation of the sphincters from fright is very often seen in children. Polyuria, the induction of profuse diarrhœas, and premature delivery may all be cited as instances of mild shock from emotional causes. The special senses, particularly that of hearing, are at times permanently impaired by painful emotions. Whether the latter can produce a fatal shock without corporeal injury of any kind in a healthy individual is very doubtful. The deaths attributed to it have for the most part occurred in persons in whom the circulatory organs had been impaired by the previous degenerative changes of age or of disease.

In the category of psychical shock might be classed railroad shock in which, so far as can be seen, no physical injury has been sustained. The shaking up of the body, with the dread of impending death, so impairs the equilibrium of the cerebro-spinal centres that resultant shock is of more than ordinary severity and duration. It is quite characteristic of this variety of shock that it is often late in developing, hours or days elapsing before anything is complained of. Restlessness and excitability, disturbed sleep and migrating pains, want of appetite, and lack of interest in current events of even a personal nature, are further evidences of this variety of shock, of which it is further characteristic that the symptoms are for the most part purely objective, and therefore most readily made the subject of medico-legal inquiry. The discussion of railway shock at length is beyond the scope of this article.

Some poisons, like the cyanide of potassium and veratrum, produce shock by directly depressing the heart. Others, like the mineral acids when ingested, produce shock like an ordinary trauma by the destruction of tissue and the impressions made on nerve-fibres. Far more important from the point of view of frequency of action are the toxic

agents generated within the body and carried into the circulation to affect primarily the nerve-centres and through them the vaso-motor apparatus. The depression attending a congestive chill, the rigor following the use of an unclean catheter, the chill of a beginning pneumonia or of puerperal fever, may be cited as instances of shock following the overwhelming of the circulation by septic material. So simple an operation as internal urethrotomy has not infrequently been followed by death in twenty-four hours with the symptoms of shock. The opening of large joints or of the peritoneum was generally followed by the same disastrous results in pre-antiseptic days. Where sepsis is associated with gangrene the shock is often rapidly fatal. A healthy young man was struck in the popliteal space by the prong of a dray. The knee-joint was opened, but there was no other injury. When seen an hour later shock was marked. Two hours later he was delirious; death resulted thirty hours after the injury, the limb having become gangrenous to the trunk. In an extensive burn recently seen the temperature had risen to 105° F. six hours after the injury. Shock often means *sepsis acutissima.*

The marked features of shock depend on a depression of the function of the circulation. It is claimed by Jourdan that the pulse is at first reduced in frequency. This view is not supported by clinicians generally. Probably in all cases of considerable severity it is rapid and feeble, irregular, and often intermittent. The arteries are small and the circulation through the capillaries sluggish. The skin is cool to the touch. The lips and conjunctivæ are pale and bloodless. The face is pale, often of an ashy hue, and covered with beads of perspiration. Bleeding from wounds is slight. There is ordinarily a reduction of temperature of two or even three degrees. Respiration is shallow. The eyes are lustreless, but there is usually no expression of anxiety. Extreme languor is characteristic of severe shock. The patient, though conscious and answering in monosyllables in a voice scarcely audible, is indifferent to everything about him. The sensorium is blunted and pain is scarcely felt. The protrusion of bones through a limb that is crushed causes no pain; only when a voluntary movement of the injured part is made is pain experienced. The anal sphincters are often paretic. Retention of what little urine the flagging circulation through the kidneys permits to be excreted is the rule. In severe cases death may ensue at any time within twenty-four or forty-eight hours without any evidence of increased energy on the part of the circulation. Often in the fatal cases, particularly if hæmorrhage complicates the clinical picture, other phenomena supervene. The hands appear shrunken; there are dimness of vision, numbness of the extremities; and chills or convulsions. Repeated attacks of syncope, muttering delirium, and coma may precede death. When reaction ensues it is usually inaugurated,

as in cerebral concussion, with vomiting; the pulse decreases in frequency; the temperature rises to or above the normal, and color again returns to the face. In very many cases the reaction is slight, and, particularly in individuals of advanced age, is likely to be evanescent. Alternating periods of temporary reaction and depression are witnessed until a fatal prostration supervenes.

Travers was the first to call attention to an erethistic form of shock which he termed "prostration with excitement." It differs from the more common variety chiefly in the psychic phenomena. While consciousness lasts the patient is wild with anxiety. He is for ever changing his position, struggling for air. A limb that is crushed may be tossed about until the audible creaking of the bones makes the bystanders shudder. The patient is unconscious of it. He is oblivious to everything but his impending fate. Usually delirium of a muttering or violent kind soon supervenes and the scene is ended in coma. This form of traumatic shock is frequently encountered in excessive drinkers, and in the wards of our public hospitals it is seen in fully one-fourth of the fatal cases of shock.

Fortunately, shock does not always present the gravity of symptoms above detailed. Cheever has epitomized the degrees of shock as apprehension, fluttering, sweating, chilliness, pain, vertigo, nausea, faintness, convulsions, unconsciousness, and collapse. In mild cases a combination of one or more of these symptoms is often observed. As in cerebral shock, they often disappear with great rapidity.

The general organization of an individual largely influences the degree of shock. Persons of a nervous temperament bear traumatism badly, and in this regard women seem to suffer less from shock than men. Persons advanced in years suffer more from shock than persons under forty, and as a rule children suffer less from it than adults. Probably it is because the functional influence is less potent and the circulatory apparatus as an entirety is more active. When shock is very marked in children it will generally be found attributable to hæmorrhage. Children bear the loss of blood poorly. In adults also hæmorrhage adds greatly to the severity of shock. Many of the symptoms, such as the collapse, can be produced by hæmorrhage alone. In the treatment of shock the recognition of this fact is vital. In persons enfeebled by organic diseases shock is likely to be severe. Degenerative changes of the heart, the liver, and particularly of the kidneys, may cause even minor injuries to be followed by fatal shock.

**Treatment.**—The principles enunciated in the treatment of cerebral shock underlie the therapy of general concussion. To maintain the body-heat and to support the flagging circulation, to remove whatever might prolong or exaggerate the condition, are the objects to be

sought. Hot-water bottles to the trunk, but separated from the skin by a layer or two of thin flannel, and an abundance of warm covering, but not too much, lest respiration be impeded, are important. Rest as far as possible should be given the patient; moving him about from one position to another or from bed to bed is pernicious. Until reaction has set in the clothes should not be removed, except to an extent sufficient to permit an examination. This should always be limited to determining that shock is not maintained by hæmorrhage. A mangled member should be loosely wrapped in towels saturated with sublimate solution and kept elevated on a pillow until a permanent dressing can be applied. Where collapse is threatened from hæmorrhage the latter must be arrested. A bleeding mutilated limb can often be severed with a few strokes of the scissors, and the vessels tied without an anæsthetic and without inflicting much pain. Formal amputation can be done when reaction has partly set in. In the medicinal treatment of shock the subcutaneous method gives the quickest results. Ether, nitro-glycerin, camphorated oil, or whiskey can be injected under the skin as the urgency of the occasion demands. Three or four injections of 1 drachm each of sulphuric ether or of whiskey may be administered. The pulse generally rallies immediately after the injections. To administer stimulants by the mouth is often worse than useless. The patient may be unable to swallow; the effort but increases the prostration. Absorption by the stomach, if the stimulants can be made to enter it, is also deficient. If there has been much hæmorrhage a copious enema of hot water and brandy is indicated. In severe cases of shock with collapse from depletion, an intravenous injection of a hot salt-solution will occasionally induce reaction when other methods have failed. The solution should be in the proportion of 1 to 200 and the temperature about 100° F. Since this intravenous method has been advocated in the treatment of the collapse of cholera the transfusion of blood has been almost entirely supplanted. The circulation cannot regain its force because the heart-pump is empty. Therefore elevation and bandaging of the limbs are often indicated while the salt-solution is being prepared. Among the agents highly recommended in shock is digitalis. In cases in which moderate shock continues for hours or days, and in which the patient reacts imperfectly and relapses, digitalis has proven very valuable. Half-drachm doses administered every hour will usually in protracted cases bring about gradually a condition of the circulation approaching the norm, without at any time inducing sudden changes.

A very important indication in the treatment of shock is the alleviation of pain and the procuring of sleep. Therefore morphine in $\frac{1}{2}$-grain dose, repeated if necessary, will be required in almost every case of severe shock. Were we restricted to the use of one agent in the

management of shock, we should select this one. In the cases of prostration with excitement it is indispensable. If it is possible to procure sleep for the sufferer, much has been done toward placing him in the way of reaction.

Until reaction has supervened the patient is in no condition to bear the added trauma of an operation. Occasions may arise where operative interference becomes imperative notwithstanding the presence of shock. The necessity for checking hæmorrhage and the informal removal of mangled members has already been mentioned. In cases of strangulated hernia the shock is often severe *ab initio*. To wait for reaction before attempting reduction is out of the question. In acute intestinal strangulation in perforating wounds of the abdomen, in rupture of the uterus, the presence of moderate shock is no contraindication to operative interference. If anæsthesia is required, it should be made as short as possible; that by ether, being more stimulating, should be given the preference.

**Prophylaxis.**—In the mitigation of shock following major surgical operations anæsthesia comes first in importance. Anæsthesia lasting for more than an hour by reducing the animal heat doubtless contributes to the shock. Anæsthesia of shorter duration does not diminish the body-temperature. Hence anæsthetics should not be administered until the surgeon is prepared to operate, nor should they be continued longer than is necessary. Consciousness returning tardily, sutures can be introduced and dressings can be applied after the anæsthetic has been removed. An operation should never be begun until complete anæsthesia has been obtained. To diminish the shock of anæsthesia by eliminating the struggle of the first stages a hypodermic injection of morphine and atropine should always be given. The operation itself should be done as quickly as is compatible with good work.

Exposure of large wound-surfaces, thereby facilitating the reduction of temperature, is to be carefully guarded against. In large hospitals a steam or hot-water coil may be placed within the operating table to maintain artificial heat should it be required. An abundance of warm blankets, bottles of hot water, or heated bricks should always be in readiness whenever a major operation is contemplated. In the prophylaxis of shock following operations the prevention of hæmorrhage is of prime importance. In operating on the extremities the Esmarch straps, the hæmostatic forceps, and preliminary elevation of the limb and buried ligatures have largely eliminated this source of shock. Compression with temporary dressings will almost always check the oozing. In operations in the abdominal cavity and the neck vessels should be ligated before they are divided.

# MORBID HABITS.

By T. D. CROTHERS, M. D.

## ALCOHOLISM AND INEBRIETY.

The term "alcoholism" is generally used to describe a class of cases which have become diseased by the continuous and excessive use of alcohol. In reality, an increasing number of these cases begin to use spirits to excess suddenly, and pass rapidly into chronic states. The use of alcohol is only a symptom, and the cases are not those of true alcoholism, because they are due to other causes. The term "inebriety" is more accurate, because it indicates a general condition, and not a particular or special cause.

Inebriety—or, as it is more commonly termed, drunkenness—has existed from time immemorial, but in these modern times it has taken on new types and new forms. The moderate drinker of the past is disappearing, and in his place comes the impulsive maniacal drinker, who at once or after a short preliminary stage becomes an excessive user of spirits. Acute organic affections follow, and complex brain- and nerve-degenerations appear, for which medical treatment is demanded with increasing frequency. A clinical study of the accurately-grouped histories of a large number of cases brings ample confirmation of the fact that inebriety is a disease, with a distinct and largely traceable causation, a uniform development and progress, a uniform symptomatology and termination. The general practitioner is unable to study and follow these cases with the exactness of the specialist, yet he can often verify and point out facts unknown to the latter. A knowledge of the general character of these cases is of great value. Referring the reader to the special treatises on inebriety, the present purpose is to point out some common problems and their clinical solution.

The physician is often called to a class of cases in which a previously temperate, reputable man in middle life begins to use alcohol to excess, and exhibits a rapid decline of character and conduct. His intellect seems but little impaired, but he is irritable, conceited, and bold. No physical symptoms of any prominence are found, and the unreasoning, strange, impulsive use of alcohol seems to be the only

morbid condition. To his friends some change has occurred, and the family physician is called. A very exhaustive study should be made of his conduct and general character, extending back many months. This not infrequently brings to notice some event that was unusual, such as unexpected rashness or selfishness in some business project, or severity and harshness toward his family, or change of belief in religious and political matters, or perhaps a strange credulity, suspicion, or ambition for notoriety and office. These are termed "fads" or "freaks" or whimsical notions or impulses, and when they occur in persons previously free from them, and who use spirits to great excess, are strongly suspicious of some organic brain-change. Often many irregularities and a change in the *morale* of the man are noticeable; unexpected sexual craving is manifest, and low company may be sought either boldly or secretly. Hasty marriage without reason or judgment is contracted, or a strange ambition to be prominent in society or to seek the company of women and their adoration develops. With these physical changes are associated nutrient disturbances, insomnias, neuralgias, with sudden exhaustion and increasing fears of disease or death. These and other changes are found to precede the drink-impulse, and are reasons for supposing that either general paralysis, acute mania, melancholia, or dementia are impending. The brain- and nerve-condition is one of progressive degeneration, and the drink-impulse is a psychical demand for relief. The patient should not be dismissed with moral advice or treated as one of weak will. He is suffering from grave disease, which is curable only at this stage if ever. He must have perfect rest and protection from the drink-impulse, together with the best tonic and hygienic care possible. When such patients are placed in regulated surroundings, either at home or in a public or private asylum where all use of spirits is stopped, many new symptoms appear. If the case is one of incipient paralysis, the brain disturbance and irritation will increase, and abnormal nutrient impulses will appear. Masturbation, sexual delusions, and intense desire to be with women or to correspond with them may follow. He will eat irregularly and drink water, tea, and coffee inordinately. He may exhibit in a general way and along accustomed lines of thought his usual intellectual power. Suspicions of injustice and wrongs are frequently present. He will display a want of steadiness of brain- and nerve-force, and a recklessness of the effect of his conduct, which cannot be mistaken. This condition may continue for months and sometimes years, and the alcoholic desire pass away or give place to a mania for opium or other narcotics. The physician should clearly diagnose such cases, and base all advice and treatment on the facts. He should never sustain a moral theory of causation, and consent to the patient assuming all the obligations of a healthy man. Such cases frequently die of

acute disease, and do not develop the more pronounced symptoms of general paralysis.

Good illustrations of these cases are found in all inebriate asylums, where for years they remain in about the same state, relapsing on every occasion, and in the intervals displaying all the psychical symptoms of general paralysis and many of the physical signs. Sad and preventable mistakes are continually following the failure of physicians to make a correct diagnosis in these cases; as, for instance, in the settlement of wills and the adjustment of business relations and all the complex questions which spring up concerning the responsibility of the patient.

These cases comprise a large number of those who through friends apply for treatment and are sent to asylums. Another class only come under medical recognition when they get into legal troubles. In divorce suits, in charges of assault, in disreputable acts, and strange conduct, and in perplexing illness, the physician is called. As a rule, their use of alcohol is always associated with what is termed "having a good time," but literally they are states of emotional excitement, nervous exaltations, and reactions from the monotony of life and surroundings. Or it may be psychical reflex irritations or contagions which, from repetition and cultivated tendencies, have grown to be diseased states.

This class always show signs of acute degeneration in all their habits of life and living. They use spirits with great irregularity; they work with the same uncertainty. Like the squatter settlers of a new country, they are always ready to move on, but movement is rarely upward, but in the course of years downward. They are known in all communities as the active supporters of the saloon and the defenders of the use of alcohol for all purposes. While the symptoms of disease of body and brain are not so pronounced and more difficult to define, yet they exist, and the physician should act on this conviction. Often medical treatment is followed by the best results—treatment that involves change of modes of living, and that places these people in positions where obligation requires exactness and uniformity of conduct. These persons occupy a doubtful position on the borderline in regard to mental and physical health, as well as character, and are always the progenitors of a generation of inebriates or those who are insane or epileptic, and other pronounced defectives. The physician should advise earnestly against every measure that would encourage their present habits. He should urge their doubtful mental condition and the absolute need of enforcing hygienic rules of living.

The highest triumphs of science consist in breaking up the causes and breeding-grounds of neurotic degeneration. The solution of the alcohol question will never be reached until medical men point out the sources in these neglected classes, and urge public sentiment to recog-

nize its physical aspect and sustain methods of treatment from this point of view.

The treatment of this class in prisons at present is singularly fatal, and less than 2 per cent. ever escape or recover after the first commitment to jail. A species of acute psychical degeneration comes on which ends fatally. The physician should demand that these offenders be housed in hospitals, and be treated specifically by means and methods adapted to their peculiar conditions.

In other cases, in which the sudden excessive use of spirits has been preceded by a less prominent chain of symptoms, the withdrawal of spirits unmasks the acute mania of which the use of alcoholics is a symptom. Such cases exhibit a high state of irritation and intense activity, with unreasoning boldness, in all their business and social relations. They drink constantly, and are in a state of partial delirium which alarms the friends who seek medical advice. As in general paralysis, a careful study will reveal a chain of brain- and nerve-degenerations that have preceded the drink-impulse, and are often greatly intensified by the use of spirits. When such cases come under control and the spirits are removed, acute delirium follows, requiring restraint. This frequently subsides and merges into melancholia. Masked deliriums are more common, in which the patient is intensely agitated from imaginary causes. He cannot sit still, and suffers from suspicious delusions—has dreams of drinking and other exciting scenes. If in an institution, his agitation concerns the time he is to stay, the loss of reputation he is suffering by such a stay, and the injustice of being brought to such a place. If under restraint at home, the entire course seems childish and the occasion for it a great blunder. These manias are always associated with delusions which remain indefinitely, but sometimes merge into strange superstitions and great changes of conduct.

When melancholia follows, often the most complex imperative conceptions take possession of the brain. Most of these cases retain a thin form of normal reason, and often act on automatic lines of previous work. To the physician such cases, both in and out of institutions, are serious and uncertain. They require careful medication and the application of means to change and divert the functional and organic processes. Acute inflammations are always likely to come on, also various complex insanities that may become homicidal and suicidal at any time. Some of the worst crimes are perpetrated by such cases, and after a short imprisonment the patient develops into a well-marked insanity that is hopeless. The prodromic period marked by brain-failure and the drink-craze was overlooked, and thus the curable stage was passed.

Another class of cases come frequently under medical cure. They are the periodical inebriates, or those who drink spirits in excess at

certain distinct intervals. An extended study will show a neurosis either inherited or acquired. A large proportion of these cases will have parents who are insane, epileptic, or moderate or excessive drinkers. It is affirmed that persons who live in malarious districts and suffer from malaria have descendants who are most frequently periodical drinkers. The tendency to these drink-storms resembles epilepsy closely, and many very curious facts are noted. Usually they occur at gradually shorter intervals until dementia or death supervenes. In some cases the free intervals remain the same for years, and in certain cases come and go with astronomical exactness. In one this free interval is always ninety-one days and two hours; in another, sixty-two days and four hours; in a third, forty-four days. Many of these cases are secret midnight drinkers, who recognize their malady and prepare for it. Some of them are active professional men and temperance lecturers who are doing very important work in the free interval, and who suffer keenly on the return of the malady, but are unable to resist, so give up to the impulse, only seeking to conceal it and shorten its duration. These persons are often the most reputable, temperate, and influential men in the community, and their treatment is of the greatest importance. The question of home treatment is more urgent than in all other inebriates. A thorough study of the history of the case will show the hereditary influence of diet, surroundings, work, climate, failure and success, and strains and drains on the nervous system.

In heredity a neurotic ancestry of any kind will complicate the therapeutic problem. The diet is of first importance, both as to quality and regularity. The food should be non-stimulating, all irritating condiments being avoided, and consist largely of fruits, grains, and vegetables. Nitrogenized diet and meats are only useful after the subsidence of the paroxysm. Each case will give indications of how far the quality and regularity of diet have influenced it, and also suggest what changes can be made to improve it. The regulation of diet is very essential; in many cases the drink-paroxysms have diminished in intensity and duration by this means alone.

The importance of attending to the surroundings is obvious. Bad hygienic conditions, bad mental atmospheres, bad sleeping-rooms, all lower the vital forces of the body. The strains incident to railroading, brokerage, or any work that requires incessant care in conditions unfavorable for rest or relief, strongly predispose to this malady. Not unfrequently, a change of climate brings relief. The periodicity of the drink-storm is clearly influenced by all these forces, and may depend largely on some particular one that an inquiry will reveal. Medicinally, the return of the drink-craze may be averted or partially neutralized by the free use of the bromides a day or more before the expected time of return. Strychnine, either in solution or hypodermi-

cally, in doses of $\frac{1}{40}$ grain, is also very valuable. It can be used every four hours before the paroxysm comes on. Acids, particularly phosphoric and citric, are good. The bromides can be given in 100-grain doses with impunity.

The remedies usually found most valuable are these: With the first indication of the return of the drink-paroxysm a saline draught composed of Rochelle salt and bitartrate of potassium, 2 ounces of the latter to 1 of the former, may be given in one dose, repeated every two hours until the bowels act freely. This may be followed with 100-grain doses of bromide of sodium in peppermint-water every four hours until the sedative effect is obtained. Usually the patient recovers without any further medication. If the nerve-irritation continues, a hot-water or Turkish bath, with vigorous rubbing, and sulphate of strychnine in $\frac{1}{40}$ grain doses every six hours, is often effective. Many persons in active life who have drink-paroxysms at distinct intervals are able to control them by means of prolonged Turkish baths and bromide of sodium in large doses, with rest in a quiet room. When the paroxysms return after a very short free interval, the medication should be particularly directed to nutrition. In many cases, in persons having little or no exercise and who are hearty eaters, digestive poisons are present, and the drink-paroxysm may be largely due to this source. The good results of sharp eliminative measures seem to indicate this. In a certain number of cases the drink-impulse is never felt except after nutrient excesses. The practical remedy is a calomel purge, followed by salines, hot-water draughts, and careful diet. In a large number of these cases there is a strong tendency for any strain or disorder, either physical or mental, to manifest itself in this drink-symptom. Hence this symptom should suggest some fault or error to be corrected.

To control the drink-paroxysm many persons use a compound like the following:

| | | |
|---|---|---|
| ℞. | Sodii bromidi, | gr. xl; |
| | Chloralis, | gr. xv; |
| | Ext. gelsemii fluid., | ♏x.—M. |

A method adopted by Dr. Jackson, and used by the late Dr. Parrish and others with some modifications, on the approach of the drink-paroxysm, was to sweat and purge the patient. A saline purge, usually of Seidlitz powders, preceded by calomel, was given, then a prolonged copious perspiration was excited, and followed by rubbing. If the nervous irritation continued, bromide of sodium was given in 40-grain doses. This was followed by 5 grains of quinine four times a day for a week or more, and 15 drops of fluid extract of hyoscyamus,

repeated every three hours until the patient became quiet. This method is used in many asylums, and for temporary relief is often valuable. The paroxysm controlled by this means seems to return with decreasing intensity until it finally disappears.

When the paroxysm is controlled and recovery follows, the length of the free interval is often very uncertain. The paroxysm may return in a few days or weeks, or after the usual interval. The case should be under constant medical care and observation, and the objects sought should be to build up the general system and remove all possible causes that would excite the return of the paroxysm.

Two courses are practical: one, to build up the patient as far as possible in the free interval, and give no narcotic or sedative during the drink-storm, only using salines and fluid foods, and, as the paroxysm subsides, give acids and mineral waters; the other is to administer the bromides, and other narcotics freely before or at the beginning of the drink-craze, and thus obtain full control of the case. When the cases exhibit premonitory symptoms of the approach of the attack, this can be done, but when the onset can only be estimated from past experiences, it is more difficult. In the latter method, if any form of opium, cocaine, or alcohol be given, a ready control will be obtained, but at the peril of merely changing the form of the drug-craze.

All these periodical cases may merge quickly into opium, alcohol, or cocaine patients, and for this reason it is a grave question to determine which course to pursue.

In a case in which the drink-paroxysms develop homicidal impulses, that are morally sure to end in disaster, the question comes up, Is the physician justified in switching the patient off to the use of opium, in which all such danger disappears and the patient glides down to a quiet, dreamy death?

An illustrative case was the centre of much criticism. A man of wealth and position, with neurotic inheritance, became at fifty a periodical drinker. He drank at home for six or seven days, and on the last two days of the paroxysm he suffered from delusional mania and was homicidal. He had repeatedly injured his wife and children and permanently crippled an attendant. On several occasions he escaped and assaulted persons on the street. The physician, with the consent of the family and patient, changed him quickly to a morphine-taker. All homicidal tendencies subsided, and for the next five years, up to death, he was a quiet, dreamy, harmless case.

Each case must be judged from the facts of its history, and the condition which provokes the paroxysm is the objective point of treatment. In my experience all means and measures to build up body and brain, and thus lessen the intensity and duration of the paroxysm, are most

practical, and narcotics are of doubtful value, except perhaps at the onset of the drink-storms. The control of the paroxysm is only a small part of the treatment.

A clinical fact should always be remembered, that many of these cases recover spontaneously and from unknown influences. Cases which have been under treatment for years and are considered incurable have suddenly, under the most adverse circumstances, recovered. Or, more literally, the drink-impulse has died out and the man become a total abstainer from that time. In some cases the man may have signed the pledge and promised reform innumerable times before. At last he will repeat the process and never drink again. As in other matters, the last remedy or means used is credited as the true one. In religious revivals or temperance movements a certain number of inebriates permanently abstain and are called examples of cure. The vast number who experience the same influence and relapse are lost sight of; the few that are saved are reported as shining examples. The fact that they have gone through the same process many times before is forgotten. This cure is simply an exhaustion or dying out of the drink-impulse. All the previous defects of body and brain remain. The palsies, both physical and mental, the delusions, the brain- and nerve-perversions continue, but all desire for spirits has passed away. Some change has taken place in the brain; the symptom of a craze for spirits is gone. The man may be a criminal, a pauper, a maniac, an epileptic, or an idiot, but this drink-symptom never returns. The degeneration has changed. The quack specific remedies or any much-vaunted drugs, the mind cure, hypnotism, and any prescription or form of remedy, may seem to be effectual at the last moment. Powdered brickdust if loudly vaunted, will show instances of cure, but a change of symptoms is not a cure.

Between the ages of forty and fifty years these obscure changes, of not only the drink-impulse but other conditions of brain-activity, occur. They correspond so accurately to climacteric changes in women as to be called by the same name. In women the drink-impulse often dies out at this time or begins.

Another class of cases come under medical care that are still more difficult to treat. They are generally young men, sons of wealthy parents, and men who from bad mental surroundings, bad company, ignorance, and neglect are periodic or continuous drinkers.

The physical elements in the causation are less apparent in such cases, and the assumption of a moral origin is to many a strong conviction that cannot be readily displaced, but the fact of excessive drinking suggests a physical state that cannot be ignored.

Children of wealthy parents by continuous nutrient excesses soon develop perversions of appetite, and with absence of exercise and nat-

ural living early suffer from functional disturbances which find relief in spirits. This condition rapidly merges into excessive use of spirits and still greater departures from all ranges of healthy living. Under any circumstances states of exhaustion and instability of the brain-centres are present. Often bad hygienic conditions are influential in these cases, and a radical change of life and surroundings is essential. An ocean-voyage or a sojourn on some frontier ranch may bring relief, but the absence of care and control and bad mental surroundings go far to destroy the value of these means. Such cases should be placed in conditions of life where a rigorous physical and mental training can be applied under the physician's constant care, which should consist of a daily system of exercise, diet, baths, tonics, and exact duties that must be followed up religiously. The case must go in training under the care of an attendant and physician, who will regulate all the surroundings and conditions of life. The object is to build up and restore the perverted energies and teach the man how to live naturally. If this cannot be done at home, an asylum offers the next best place. If the case comes from bad surroundings and the lower walks of life, where early nutrition has been defective in quality and quantity, and neglect has driven him to the saloon and its contagion, a similar range of physical causes are essential. In such patients medical treatment is often of great service.

Of tonics, nux vomica, in doses of $\frac{1}{2}$ to 1 grain three times a day, is valuable. Arsenic tablets of $\frac{1}{30}$ grain twice or three times a day are equally useful. If there is a history of malaria, some form of quinine should be used, and iron can be employed for a short time with advantage. Both iron and quinine are of no value after a few days or two weeks in these cases unless there is a history of malaria present. Of diet in these cases, Dr. Turner long ago pointed out the value of lean meat well cooked and served at regular intervals. Other authorities urge a farinaceous and fruit diet exclusively. A combination of both, giving the preference to the former, seems to be followed by the best results.

A class of inebriates are yearly becoming more numerous whose drinking dates from some state of nerve- and brain-exhaustion. They are from circles of business and professional activity, where overwork and general neglect of healthy living have provoked the use of spirits. Such cases are largely curable, but must be impressed with the gravity of their disease and the need of physical remedies. Where there is an inherited predisposition the degeneration present is greater and the prognosis less favorable. The removal of alcohol is only the first step in the treatment. Prolonged nerve- and brain-rest under the best possible conditions are absolutely essential. Such cases cannot expect to recover by abstaining from alcohol alone; a few weeks' residence in an asylum or

treatment at home and the subsidence of the drink-desire are only the beginning. From one to three years are required to bring permanent restoration. After the first stage of treatment a prolonged residence in the mountains or at the sea-shore, entirely removed from all mental care and responsibility, is required.

The alcoholic symptom is regarded as the real disease, but inquiry brings out the fact that states of nerve- and brain-exhaustion have preceded it. Not unfrequently, complex and puzzling psychical symptoms of melancholia and mania are associated with this condition, and such patients are taken to insane asylums. Their rapid recovery is misleading, and the supposed alcoholic origin is an error that is not understood. They go back to business and relapse, and this continues until their true state is finally recognized.

Another class of cases appear in which the origin of the excessive use of spirits is due to some brain-injury, such as blows on the head and brain-shocks. The drinking will be impulsive and unreasoning, generally continuous, but, if periodic, of an intense maniacal character. In the history previously temperate men will suddenly begin to use spirits after physical or psychical injury of the brain or nervous system. Some of these cases date from railroad injuries or shock, where profound fear and alarm were followed by intense exhaustion and depression; or injury, such as a blow on the head, a sunstroke, a fall in which the brain and nervous system are greatly agitated, and other states which are termed psychical traumatisms, are not unfrequently followed by a craving for spirits. When there is a clear history of some obscure injury antedating the inebriety the treatment becomes a serious matter. The craving for spirits will only subside when the brain-states which excite it are restored. Tonics, alteratives, baths, foods, change of life and surroundings, are essential. Iodide of potassium in 10-grain doses three times a day, and nux vomica in 1-grain doses at the same intervals, are very excellent remedies. A Turkish bath and massage every other day, exercise in the open air, and quiet surroundings, are valuable. Iodide of arsenic is used by many, who extol it highly. The disease is one of central brain-degeneration, and requires in treatment the highest skill and judgment possible. Checking the drink-craze by narcotics is like covering up a fire, only to have it break out again with greater intensity.

Such cases change readily from one drug to another. Opium, chloral, cocaine, and any other drug which may relieve the psychical pain are used. This tendency to resort to drugs should always excite suspicion of some brain-traumatism. Home treatment under the constant care of the family physician, or institutional treatment, is the best means of restoration. No halfway moral or medical remedies will avail. The case requires as thorough and systematic care as one of

acute organic disease or any form of insanity. Some of these traumatic cases of inebriety develop into epilepsy, which follows from a short drink-excess, and often takes on homicidal forms. Others run into general paralysis, and the drink-craze dies out. While these cases differ widely in the intensity and duration of the drink-desire, they rarely recover except from positive medication, and end frequently in acute organic diseases, which are usually fatal.

The term *dipsomania* is used to designate certain cases in which the impulse to procure spirits is literally a mania, and possesses the mind to the exclusion of every other thought. This mania may come on suddenly, and the desire for spirits be so intense as to sacrifice every consideration of sense and judgment. When it is gratified the mind returns to a normal state. This impulse may begin and grow through days and weeks until the opposition of conscience and reason is overcome and its full gratification accomplished at all hazards.

Such cases frequently seek medical help to break away from an imperative conception of the pleasures of drink which fills all their thoughts, both when awake and asleep. Often a strong cathartic and a Turkish bath daily, with massage, will overcome this feeling. Bromides, iron, phosphorus, and cinchona are useful, with a change of surroundings. A combination of the bromides of potassium, sodium, lithium, and calcium is often efficient in stopping this morbid impulse. Monobromated camphor in 5-grain pills, given every two hours, has the same effect. A hot bath with rubbing is a standard remedy of great service, and should be tried for its sedative action on the nervous system. If the patient is overfed and plethoric, with deposits of fat, saline mixtures should be used freely. Carbonic-acid waters often act as sedatives. A pill of phosphorus $\frac{1}{2}$ grain, nux vomica 2 grains, and arsenite of iron $\frac{1}{4}$ grain is often very valuable in building up the system and lessening future attacks. Dr. Day uses a preparation of permanganate of iron for these cases. Fowler's solution, in 5-drop doses three times a day, is the favorite remedy of nearly all specialists.

This insane thirst for alcohol is only symptomatic, and is not the disease to be cured, but an unmistakable sign of profound brain- and nerve-irritation.

The dipsomaniac is only an exaggerated type of the periodical drinker in whom the drink-storms become manias. The question comes up in the treatment as to physical restraint. Restraint to prevent the gratification of this morbid impulse or control by narcotics alone is not curative. The patient must have thorough medical treatment in a well-organized asylum for inebriates. Sanitariums and private insane asylums are found to be unsuitable on account of the association with other cases. The limits of space will not permit the

mention of the many complex cases of inebriety constantly coming to the attention of the physician for advice, which, unfortunately, he is unable to give in many cases.

The morbid appetites of children are clear early symptoms, and the wild, impulsive use of wine and beer soon after puberty has a pathological meaning. Later, a degenerative tendency, with unstable brain-activities, are handwritings on the wall that the physician should read and interpret. The treatment of these cases should be based on general principles above all theories and superstitions as to the causes. Each case should be examined from a physical point of view and treated on the same basis.

Many adults abstain from all use of spirits as long as their efforts and ambitions are successful. When adversity comes, with failures and disappointments, the drink-desire springs into activity, and with it are associated all the bad sanitary and physical conditions which favor its growth. If the tide turns and success begins, they sign the pledge, join the Church, and are restored. With the return of adversity they relapse again.

Another class have low vitality and small resisting power. Alcoholic injuries leave a permanent impress on the organism, with a strong physical bias and tendency. The favoring conditions are more powerful, and they are less able to resist bad surroundings. These cases have a very acute realization of the enormity of their drinking, and often discourse with great volubility on the causes and treatment. The egotistical delusions and instability of brain-action make them very difficult to treat medically.

In some cases the insanity of the drink-symptom is prominent. Alcohol will be used in a most reckless, insane way. Nothing but continuous stupor will satisfy the impulse, irrespective of all circumstances or conditions. Sharp restraint and active treatment by purgatives and baths are frequently effective. Mineral waters and acids seem to act better than vegetable tonics. The insanity of these cases should be early recognized and the patient come under treatment.

Other cases have a distinct insane diathesis, and inebriety is only another phase of this condition. The treatment of such cases by moral means alone is a sad reflection on the intelligence of the friends. In such cases, and in those who are possessed of these symptoms late in life, active brain-work should be given up and they should become muscle-workers. They should be employed in some out-door work, as horticulture, farming, mining, or stock-raising. Positions of care and responsibility are full of peril. Every form of spirits should be avoided, and every condition of life must be regulated with care. When the physician impresses on the patient the fact that he cannot bear the strains and drains of life without constant peril, also that

only by the most careful avoidance of all unhygienic living and surroundings can he hope to be free from active disease, he has done his duty. If this is realized and the physician is retained as a regular counsellor, the future of the patient is good.

In the inebriety due to the degenerative changes arising from advanced age the remedies found most useful are arsenic, mercury, protoiodide of mercury, and iodide of potassium. These drugs should be given in small doses and continued a long time, and may be varied occasionally with a bitter tonic and iron. Arsenic, given in $\frac{1}{60}$-grain doses twice a day, seems to possess the most marked tonic qualities, and in some cases exercises a sedative effect, apparent in the diminished irritability and sensitiveness of the nervous system. If the stomach shows an intolerance of this drug by nausea, it should be stopped; otherwise it can be used for months without the least ill effects. The protoiodide of mercury is an excellent tonic in $\frac{1}{20}$-grain doses, but should not be used more than two or three weeks at a time, care being taken to discontinue it before any marked constitutional effects are produced. The potassium salts, chiefly the iodide, can be given when arsenic cannot be used, or they may be alternated with it. The dose should be 5 grains three times a day. If there is a rheumatic diathesis the potassium salt is valuable. No other remedies seem more active and permanent in their influence on the brain and nervous system than mercury and arsenic, frequently alternated with iodide of potassium or strychnine and some of the popular mineral waters. The value of such remedies in these obscure brain-affections is of course increased by hygienic changes of life and living, and also the steady use of baths.

Tinctures should never be used, for they always contain alcohol, which in the smallest dose is felt in the nerve-centres as a stimulus, rousing up old diseased tendencies.

Inebriety in women, beginning after fifty years of age, is always a constitutional trouble, requiring constitutional treatment.

There are many climatic conditions which are active factors in both the causation and treatment.

Repeated observations have been made showing that the dampness and low pressure of the sea-level have provoked the drink-impulse in many cases. Where the craze has subsided this unknown influence has roused it into activity again. The same is true of high mountain regions. Cases will appear who use spirits to great excess, either at the sea-shore or in mountain regions, and are unable to control themselves. Merely changing the location enables them to live temperately. Here some barometrical influences are the active factors. In one instance an excessive spirit-drinker, living in New York City, who had failed to recover after repeated efforts, moved to the Green Mountain

regions and was a total abstainer ever after. Another case, a resident of Colorado who was considered an incurable, moved to New Jersey, and was able to abstain and live a temperate life. This is an important factor to be considered in each case, and should be studied. Asylum treatment should always combine the Turkish with saline and vapor baths. These remedies can be used with the best results in all cases.

Where fatty deposits are apparent, with plethora and excessive abnormal nutrition, the effect of prolonged forced perspiration, with massage, is excellent. A daily bath for weeks is often of the greatest value. In some cases the drink-impulse is broken up by this means alone, and when the bath is neglected the desire for spirits returns. Experience will convince any one that the hot-air bath is one of the most powerful remedies that can be used for the drink disease. Saline baths should be used, and when given after the Turkish bath are very stimulating.

In the extreme stages of nervous prostration from the use of spirits a hot-air bath with rubbing, followed by a salt-water bath, or simply resting a few moments in a strong solution of salt water of the temperature of 90°, is followed by a most refreshing sleep. This should be tried in delirium tremens; often no other remedy is more valuable. A saline purge in conjunction is also useful. In beer-drinkers the hot-air bath is especially valuable. The vapor bath in some cases is of equal value to the hot-air, but is not so pronounced in its effects. When these cases complain of wandering pains in the extremities and loss of muscular power, with cramps at intervals, the bath is almost a specific and cannot be dispensed with. For alcoholic neuritis and rheumatism and the organic congestions so common in these cases a prolonged series of baths is absolutely essential. The value of the bath treatment in these cases will be greatly neutralized unless all the surroundings are under the direction of a physician A course of this treatment at a watering-place or mineral springs where the patient is unrestricted is of little value, because he follows the impulse of his feelings more than the judgment of others. The treatment must be exact and methodical, covering every condition of life and surroundings; this can only be obtained in an asylum. The home treatment of this class is far more difficult, and can rarely be carried out successfully, except in the early stages. It often occurs that cases cannot leave, and must be treated, if at all, at home. A course of baths, medical care, and control of the surroundings, in which all irritative causes can be removed, is possible in many cases. A careful study of each case will indicate the lines of treatment to be followed. The following cases will give a better idea of such management and care:

A banker who drank to excess at night was placed under medical care at home. The spirits were removed, and bromide and chloral given for the first three nights, with hot-air baths, massage, salines, milk, and meat broths. Out-door exercise and the constant care of an attendant followed. He was able to spend an hour a day at the bank and received regular visits from his physician. His case was considered one of brain- and nerve-exhaustion, and the rest and treatment completely broke up all desire for spirits. He spent the summer vacation in the country and was fully restored.

Another case was hereditary, and the use of spirits followed some business troubles. He placed himself under medical care and in the hands of a trusty attendant. Saline and electric baths were given in addition to hot-air baths. He shut up his city home and moved into a cottage near the city. After a year of careful treatment he fully recovered.

A third was a neurotic and hereditary case. His mother removed to the mountains from the city, and the son was placed under the care of a physician. Various tonic remedies, with baths, rubbings, diet, and careful control of all his surroundings, resulted in full restoration, and a permanent residence in the country produced a cure.

Some of these cases are apparently the result of the irritation of some little thing which a careful study will reveal and correct. In others the drink-symptom is a constitutional taint, and the remedies should be based on this fact. Some cases after a few months of asylum care can be placed under home treatment with the best results. The family physician has often more time and a better opportunity to study the case and its immediate necessities and apply the practical remedies. Home treatment either at the beginning or the end of the case is always an important factor, and the family physician should give these cases the most serious attention. Special remedies and prescriptions are simply the results of individual experiences of physicians, and cannot be applied to any large number of cases.

The wide variation in causes and conditions, and the very complex character, also the errors which are likely to complicate the diagnosis, indicate the impossibility of routine treatment.

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## OPIUM INEBRIETY.

THERE are many reasons for believing that the use of opium is increasing far beyond the legitimate demand as a medicine. It is a curious fact that wherever the use of alcohol is prohibited as a beverage the demand for opium and its compounds increases. The

conviction that the opium disease is rapidly increasing is sustained by all experience in hospitals and private practice. It is readily concealed, especially in the early stages, and even when fully developed can be so covered up as often to deceive an unsuspecting medical attendant.

The value of opium as a medicine long ago passed beyond all question. That its continuous use will cause disease is a well-known fact in medicine; but the fact that in certain conditions of the brain and nervous system its effects are so fascinating that an impulsive demand is created for it is comparatively new to science. How far this disorder depends on the influence of the brain-strains of the age is uncertain, but that other factors are active in the causation is evident from the prevalence of this disease in the dreary monotony of the Chinese civilization.

In the complexity and prevalence of disorders of the brain and nervous system these opium cases are likely to appear with the most confusing symptoms and types. Associated with this disease is an insane cunning to conceal the use of the drug. The deception and intrigue manifested in many cases indicate a degree of degeneration that is unsuspected. The vast majority of these cases appear in persons from twenty to forty-five years of age. The average duration of the addiction is ten years, and the natural termination is in dementia and death. Unlike alcoholic inebriety, opium mania never dies out spontaneously. The soil for its growth is never exhausted, and the victim never stops using the drug of his own free will and unaided. Other diseases may replace it. Alcohol inebriety may follow or any other form of drug-narcotism, but only from active medical interference and scientific treatment can recovery be expected. Moral means and remedies are worse than useless, for the free will and honor of the patient are lost.

An important fact to remember in all these cases is that some abnormal predisposition exists which finds in opium a relief and produces a crave for its continuous use. It is probably true that in all persons who use it a tendency to organic disease of some kind exists. Opium may be taken with repugnance in one case; in another the effects are so pleasant that it will be difficult to abstain from it afterward. A certain dose in one case will produce poisonous effects, in another a pleasing stimulation or relief from pain and distress. Thus the opposite effects will follow from the same doses in different persons. It is a safe assumption in most cases that some inherent tendency has encouraged its use. It is also safe to assume that in all cases some degree of constitutional degeneration exists which is not apparent from the general appearance. As a rule, these are not marked cases, and the medical attendant must depend on his judgment for a diagnosis based on clinical facts and comparisons with persons who are

well and in the same conditions of life. When a person has reached an advanced stage of the disease and thrown off all disguise, and asserts his use of opium, the symptoms are more easily studied. The patient's statement of the amount used must never be taken literally without confirmation. Often his account of the symptoms is equally unreliable.

The use of morphine in its early stages where it is concealed is often difficult to determine. Careful study of the suspected case will show, after the use of any form of opium, a slight exhilaration of spirits and an expansion of thought, with satisfaction and composure hitherto unnoticed. Often the eye assumes a brilliancy and a flush appears on the cheeks. The step is quicker and more elastic. The pulse is increased and its beat more uniform, and all previous symptoms of nervousness or debility are decreased. After a short period these symptoms fade away into a state of languor and inertia. The face becomes pallid and the eyes grow dull; the muscular activity or elasticity diminishes. The pupils contract and the patient becomes meditative. Later, when these effects are passing away, a degree of nervous irritation and depression will appear. Anxiety about little things and morbid fears of events that would not naturally cause alarm, not unfrequently intellectual changes, with slight delusions and disturbances of temper that come on suddenly and soon disappear, are suspicious symptoms of opium-taking. Emotional changes of the disposition that have no apparent physical basis are equally suspicious. The secret use of opium, as a rule, is followed by secretive manners and habits. The patient will seek retirement and avoid society at certain times. The skin will change in appearance; the eye and the complexion will be less expressive and more stolid. The following cases illustrate these facts very well:

A wealthy man made a will which displeased his family, and an expert was asked to inquire into his mental health. The expression, eye, and skin had changed within two years, and had the opium characteristics. He had become more unsocial and retiring in his habits, and at intervals was suspicious and irascible. This was followed by periods of dreamy composure and quiet satisfaction. From these and other negative symptoms opium inebriety was diagnosed, and a careful watch of all his movements failed to reveal other symptoms. His son, a lawyer, was advised to keep a daily record of his father's movements and appearance. This was made for two years, when the patient was found dead in his bed. It was subsequently found that he had received morphine regularly by mail from a distant city. The diary of his son recorded periods of excitement and depression that corresponded to times when the mails failed to bring the morphine supply. This supply was mailed every week, and during the blizzard of 1888 failed

to reach him. He became ill and sent for the physician, who treated him for malarial fever with typhoid symptoms.

In another case a man of wealth and sagacity engaged in a most unusual transaction which resulted in bankruptcy. He soon after committed suicide, and it was found that he was a secret opium-taker. The man who had furnished the opium had been instrumental in encouraging this fatal transaction, at a moment when the patient was under the influence of the drug and his mind was possessed with morbid credulity. His family physician had treated him for years without suspecting his disease.

A lady engaged to be married kept postponing the event because of ill-health, and after marriage was peculiar and very averse to society for years. In a suit for divorce the question of secret morphine-taking was raised and decided in the negative on the testimony of several physicians. Later, she threw off all disguise and was sent to an asylum, when it appeared that she had taken morphine for years and had deceived all her medical advisers.

These cases bring out the fact that the secret use of opium in any of its numerous forms is always a possibility where obscure nervous symptoms are present. The greatest care and skill in the diagnosis is essential, and each case will vary widely in its symptomatology and character.

Where the patient confesses to using opium, his own statements of his addiction should not be accepted unless they are confirmed by other evidence. Credulity in this has often placed the physician in an unfortunate position. Recently in a will contest two physicians testified that a certain amount of opium was taken daily. A druggist swore that he had sold double this amount to the person. When death takes place and legal inquiry follows the question of the amount of opium used is a matter of great importance, and the physician should be exact in all his statements.

Where the fact of opium-taking is established, inquiry into the causation will suggest the lines of treatment. The first use of opium is usually accidental; that is, it is given for some condition in which pain is a symptom. Some functional or organic affection exists, or some positive injury of the nervous system may be present. The effect of the opium is rapid and pleasing. The relief from pain is profoundly impressive, and the memory of it is so vivid that a repetition is demanded with every recurrence of pain and suffering. Insomnia and intestinal disturbances are the most common affections for which opium is used at first.

Like inebriety, some defect of the brain and nervous system or some state of exhaustion and imperfect nutrition often precedes the use of opium. This is evident from the fact that only a relatively small

number of those who use it by advice or by accident for the first time continue its use and become habitués. It is therefore important to study the period anterior to the use of opium to discover why certain cases contract the disease and others escape. The value of such a study appeared in the following case: A man fifty-four years old and very feeble came for treatment. He was taking 5 grains of morphine daily. A careful study revealed an alcoholic and insane ancestry and a long anterior period of great mental eccentricity and irritability. He had been better since using morphine, and had transacted business with success. He was advised to go home and settle all his business and permanently arrange his affairs. He refused, and went to another asylum, where the morphine was taken away and acute delirium followed, which terminated in dementia and death. It is apparent that the use of opium was masking the brain-degeneration, and was not the cause, but a symptom.

A common class of these cases are those who after years of excessive alcoholic addiction turn to opium. The history of some of these cases indicates great doubt of the practical value of withdrawing the morphine. The question not unfrequently occurs, Is not narcomania more endurable and less dangerous than inebriety? It is certain that the removal of opium will be followed by the drink-impulse or by mental disturbances equally serious. In one case epilepsy followed, and the physician was blamed for giving opium, which caused a return of the opium-habit and a subsidence of the epilepsy.

In women the withdrawal of opium is often followed by severe forms of hysteria, and a relapse to the use of opium will certainly follow, despite all precautions. Cases are not infrequently noted in which very serious symptoms of brain disease subside on the continued use of opium. The late Dr. Parrish treated a morphine habitué who on recovery became an inveterate thief. It was ascertained that while using morphine he had been honest, but before this he was repeatedly arrested for stealing. A similar case came to my notice of a kleptomaniac woman who after becoming an opium-taker reformed entirely. After treatment and recovery from the opium disease kleptomaniac impulses began. Many women who are secret or open users of opium are kleptomaniacs.

Having ascertained all the facts anterior to the use of opium, the surroundings from which it developed, and its peculiar symptoms and manifestations, the question of treatment is divested of many of its difficulties.

It is practically useless to attempt treatment unless the physician can have full control of the surroundings and the patient. This can be done at an asylum better than in any other place. When the patient is placed in proper surroundings the first question is that of abrupt or

gradual withdrawal of the opium. Authorities differ widely on this point. German authorities urge the immediate withdrawal of the drug. Dr. Osgood of Foochoo, China, who has had a larger number of opium cases under treatment than any other man, finds the best results to follow from immediate withdrawal of opium. Dr. Levenstein's method is abrupt discontinuance, and is based on the clinical experience of a large number of cases. On the other hand, leading American authorities and many others protest with great spirit against this method, and believe the gradual withdrawal is the only scientific plan that should be used.

Both methods are sustained by clinical experience and elaborate arguments, and each is correct in certain cases. I think the history of the case will determine which method can be used most practically. In a man free from hereditary taint, with a robust, vigorous constitution, the heroic method would be more satisfactory. In a case of hereditary taint, with a delicate, sensitive organization and low powers of vitality, the gradual withdrawal would suggest itself.

The heroic method is to withdraw the opium at once, place the patient in the care of a trusty attendant, give bromides and chloral in large doses during the first two days, and then withdraw them slowly. Large quantities of beef-tea, milk, eggs, and chicken broth are to be given, with hot baths twice a day, and gentle massage. For the vomiting bismuth, calomel, and tincture of ginger and cinchona are used. Whenever the active symptoms of depression subside iron, phosphorus, and cinchona tonics are to be given freely. The diarrhœa is to be treated with camphor-and-capsicum tablets. On the fourth day all bad symptoms are said to subside, and recovery is rapid from this time. It is claimed for this method that the collapse is less intense and more easily controlled, and that the patient has more vigor and vitality to bear the shock of withdrawal. The cases are said to recover more quickly and permanently, and the danger is less. In two or more weeks the patient is out and able to walk about.

By the gradual method the exact amount of opium used is ascertained, and the withdrawal of fractional parts of a grain daily or at longer intervals is begun. This may be extended over as many weeks as the case requires. In the mean time tonics and other remedies may be given. One-sixtieth of a grain of strychnine with $\frac{1}{2}$ drachm of phosphoric acid, in 4 ounces of water, is an excellent tonic. The acid may be replaced with any of the potassium salts. Pills of 1 grain of iron and $\frac{1}{20}$ grain of arsenic twice a day are also valuable. The iodides and mercury should be used where any suspicion of venereal taint is present; also, where constitution-degeneration exists. Foods and

baths are also a prominent part of the treatment. It is asserted that by this method but little suffering follows, and also a more perfect recovery, with greater strength and vigor.

A method proposed by Dr. Mattison has attracted much attention and demands a more extended notice.

The special symptoms following the withdrawal of opium are practically, "aches, pains, yawnings, sneezings, shiverings, nausea, vomiting, diarrhœa, restlessness, convulsions, exhaustion, collapse, and general distress." For the relief of these symptoms bromide of sodium is given, commencing with 60 grains twice a day, and increasing this dose 20 grains each day for seven days, until 120 grains are given twice in twenty-four hours. The amount of opium is decreased from one-third to one-half; then a gradual withdrawal is ordered, depending upon the sedative effect of the bromide. At the end of seven days the opium can all be removed and the use of bromide abandoned. The effects of the bromide may last for some time, but the hot bath with diuretics, and good food and the iron and bark tonics will soon restore the patient. Strychnine is used in this stage with the best results.

It is claimed that by this method little or no discomfort or collapse follows. The patient recovers rapidly and all the perils are reduced to a minimum. Where much debility is present a course of tonic treatment should precede the bromide course. Mercurial cathartics are used at the beginning of the treatment if needed.

It is the experience of all observers that the amount of opium taken in each case is far in excess of the demands, and that a large reduction can be made without the patient suffering from any discomfort. Dr. Mattison thinks one-third at least can be cut off in all cases; other observers say one-half. My own experience is that but little complaint is made as long as the patient is taking 10 grains of opium or its equivalent in morphine a day. If the plan of Dr. Mattison is followed, but little effect from the bromide is noticed before the third day of its use. From the third to the fifth day the patient is sleepy, with a growing indisposition to any muscular exercise. An unpleasant taste is noticed and the bromide breath is present. All these symptoms increase up to the seventh day. The drowsiness deepens into a sound sleep and the patient lies in bed not disposed to move. The tongue is furred and the pulse falls below 70 and is soft and slow. The voice grows weaker and the pupils are dilated, and often mild hallucinations of sight and sound and forms of aphasia appear. The opium is all withdrawn, and except a slight restlessness and a decided relaxation the patient is quiet and easy: the brominism may continue for several days, and then disappear, leaving only debility and insomnia.

Other methods of gradual withdrawal are urged in which beef-tea,

hot milk, and the bark tonics are used to counteract the reflex irritation which follows.

A method which has been found very practical is to prepare the patient for reduction by a preliminary treatment of from ten days to two weeks. The amount of opium is reduced at once to one-third of the amount previously taken. Pills of quinine, iron, and strychnine are given three times a day. An aperient of Rochelle salt is given every second day. The diet is well-cooked beef, milk, and fruits, without tea or coffee.

Careful observation during this preliminary period indicates whether the reduction should be rapid or slow. If the patient is well nourished and has ordinary nerve-vigor, the former plan is best. If the drug is taken hypodermically, a change of the form of the drug, to be taken by the stomach, is the first step. Then the time and quantity taken should be varied. If used twice a day, combine both doses in one at night or give them in the morning. Change frequently and reduce according to the case.

By lengthening the free intervals and combining the doses the effect of the opium is changed, and the tonics given may more readily antagonize the morbid conditions which demand this drug. The aperient dose is dropped, and the quinine pills are substituted by valerianate of ammonium and strychnine every three hours. When the opium is withdrawn bromide of sodium may be useful in occasional doses. Citrate of caffeine and tincture of lupulin are also useful. Hot baths and massage every night and phosphate of iron for the bowels are excellent remedies. Arsenite of iron is also of value.

Galvanism should be tried. (See Dr. Rockwell's paper in Volume I. of this System.) In some cases galvanism is an excitant, in others it is a sedative, and the effects will vary widely. If the patient is of low vitality and feeble nerve-vigor a slow, uniform reduction is advisable. The treatment from day to day must vary. In all these tonics attention should be paid to the patient's sense of taste. The most agreeable elixirs should be used to mask any disagreeable taste of drugs. The surroundings and food should receive equal attention. Well-cooked beef and mutton varied with eggs and chickens may be given, but wheat bread and fruit should comprise the principal diet. Quiet in a recumbent position and exercise either by walking or massage are essential every day. In cold weather uniform temperature of the rooms lessens very much the paræsthesias present. Frequent sponging with salt and vinegar solutions are of value.

When the amount of opium is reduced to a small quantity, it may be cut off at once. If the depression and relaxation are intense, return to the drug again for a day or two. The mental treatment is

very important at this period, and a trained nurse should be in constant attendance. The mind may become possessed with a mania to procure the drug in secret, or a suicidal impulse may suddenly spring up. Other impulses may appear, such as an intense thirst for coffee, tea, or some form of spirits. Concentrated foods and baths at this time often act as sedatives. Mineral salts and acids are valuable. Some of the popular mineral waters of Saratoga and Europe are often given with the best results. Hydrochloric and phosphoric acids are excellent tonics in these cases. The monobromate of camphor in 5-grain pills is useful in many cases. Galvanization has many advocates in these cases, and the hot-air and the steam bath are believed to be almost specifics.

It is absolutely essential that the patient should have confidence in the physician and be buoyed up with hope. This psychical factor is very powerful in these cases. Often the progress of the reduction should be concealed from the patient, who is morbidly introspective, and if informed that the drug has been taken away may fall into a condition of profound collapse and depression. If this period of relaxation following its final removal is passed unconsciously, the mental symptoms will be less acute. The danger of fatal collapse is very slight, and rarely occurs except in persons who are greatly debilitated.

These cases are so complex in causation and character as practically to require a special plan or form of treatment suited to the requirements of each one. Most cases have a morbid fear of pain, and urge the gradual-reduction plan and every other means that will prevent discomfort and distress. The mind is always weakened and controlled by the emotions, and the reason is incapable of steady, uniform guidance. If the mentality of the patient can be roused so as to be dominant, results follow which may be erroneously credited to drugs. In a case under treatment the physician had reduced the dose of morphine to 4 grains in twenty-four hours, and was giving tonics and baths to sustain the strength. The physician was called away and directed his assistant to continue the use of morphine without change. Ten days later he returned and found the case was out and much improved. It appeared that the assistant had given quinine by mistake for morphine, and, except some complaint the first day, no unusual symptoms arising from this change had been manifested. Here the mind-element dominated all the usual reflex symptoms.

In another case, a woman who had used opium for fifteen years, and was taking 20 grains per day, became convinced that it was the unpardonable sin. She stopped at once and spent a week in prayer in her room, eating but little and manifesting none of the usual symptoms of relaxation and collapse. She suffered from debility for two months,

but made a good recovery. In some instances a strong faith in certain remedies or plans of treatment can be roused in the patient's mind, sufficient to antagonize some of the usual symptoms. The success of many of the so-called opium specifics depends largely on this element of credulity and faith.

After the subsidence of the acute symptoms following the withdrawal of opium acute melancholy and intense depression may come on. The danger of relapse is apparent, and the patient requires prompt medication and careful attention. Hot baths, meat broths, massage, and mental change, with iron or bark tonics, are required. Hypnotics and soporifics are rarely useful until the opium is abandoned, because they must be given in enormous doses to produce any effect. The patient requires prolonged rest and freedom from drugs, except those required to build up the nutrition. The insomnia may come and go for a long time, and will often depend on some fault in the manner of living or on the surroundings of the patient. A shower-bath, beginning with warm water and gradually extending to cold, falling on the back of the neck and spine and followed by vigorous rubbing, is a most efficacious remedy. Where a shower is not available a stream of water may be poured from a vessel with the same results. Sponging first with warm, then cold water, is the next best means of relief. Hot milk taken an hour before retiring is often of value. All mental strain should be avoided, and also all special brain- and nerve-stimulants. The diet, occupation, and other conditions of living should always be under medical direction. If the patient returns to his home the same medical care should be continued.

In some cases, after opium has been taken away and the patient has recovered, a decided tendency is manifest to spasmodic nervous conditions. Intestinal disturbances come in the form of cramps; draughts of air cause intense local neuralgias; muscular exercise beyond a certain point is followed by myalgia; and special brain-activity in the evening causes insomnia; slight failures or sorrows produce melancholia and great depression. Such patients should live in the country in the best possible hygienic conditions, and be under medical supervision. Alcohol in any form is dangerous, and neither chloral nor cocaine should ever be given. The tendency to develop a morbid impulse for their continued use is strong.

When the use of opium has begun after the person has reached sixty or more years of age, the question of the advisability of its withdrawal is a serious one. In cases of cancer, chronic rheumatism, and some forms of phthisis there may be many reasons for permitting the patient to continue its use. When the abandonment of opium is followed by serious and profound mental changes which are dangerous

to the patient and to those about him, the same question will occur. The general treatment after the use of opium is discontinued should be the same as in other cases of nervous exhaustion. In my experience the Turkish bath is the most reliable and satisfactory remedy that can be used. Cases are very rare in which it cannot be employed in all stages from the beginning of the treatment. Galvanism should be tried, and in some cases it is found invaluable.

The breaking up of the use of opium is only one of the objects sought by medical treatment. The others are the building up of the brain and nervous system, so as to prevent relapse in the future and also to remove the predisposing and exciting causes.

In addition to a careful diet, well-regulated uniform surroundings and daily exercise and baths, arsenic, nux vomica, and the iodide and chlorate of potassium are very valuable. Arsenic may be given for months continuously. Nux vomica and the potassium salts should be alternated at intervals of three or four weeks.

Not unfrequently it will happen that treatment is impracticable for the reason that the surroundings and habits of living so strongly predispose to a relapse that no permanent results can be expected. Such instances are found in persons who are under a pressure of great emotional excitement and nerve-strain, as in active business and professional circles.

The withdrawal of opium and temporary treatment are useless if the patient returns to his former conditions of life, for the same cause will always produce the same results. No promise can be expected from the treatment unless it extend to all the habits and conditions of life and living. Cases in which this is neglected become chronic, and go from place to place, trying all new remedies, methods of treatment, and asylums, and finally die while undergoing treatment. They constitute a large number now under medical care.

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## CHLOROFORMISM.

THE use of chloroform to excess for its narcotic effect is not common. Nearly all cases are associated with or follow the use of alcohol or opium, for the delirium and insomnia following alcoholic excess are quickly relieved by the inhalation of chloroform. Later, alcohol is abandoned and chloroform is taken in its place. This occurs in periodical inebriates, who find that the drink-craze can be overcome by the sleep produced by chloroform.

Frequently, chloroform is taken to break up a drink-impulse after

it has existed for some time or when the use of spirits becomes nauseating. All chloroform cases are periodical at first, but in the later stages may become continuous. The drug at first may be used for the relief of insomnia or pain or some state of exhausting irritation. The relief is so prompt and complete that it is repeated. The odor and pungency become very attractive, and the dreamy oblivion is sought for eagerly.

In the early stages, when it is used periodically, the case is marked by an infatuation that is remarkable in exactness of recurrence and duration. In one case with which the writer is acquainted a gentleman would provide a 6-ounce bottle of chloroform many weeks in advance, and arrange all his business for the attack, never touching the drug until the cycle of one hundred days had passed. Then he would take two days' slumber, recover, and refrain for another equal period. He seemed to have full power to abstain up to the end of the free interval, and then gave way like a reasoning maniac.

In a second case, after some great strain of business, insomnia came on and chloroform was used for relief. Later, this drug was used every night. After a course of treatment the patient changed to an opium-eater.

Chloroform-takers are secretive and rarely acknowledge the addiction. They suffer from gastric troubles and depression, and often have trembling, languor, bad circulation, emaciation, extreme paleness, and great susceptibility to chills. Neuritis is also common, and chronic cases frequently end in muscular spasms or tetanic attacks. Syncope is also common and fatal. The treatment of these cases will tax the vigilance and skill of the physician to the utmost, for the fascination for chloroform becomes an insane impulse that will overcome all obstacles that are not insurmountable.

The impulse for chloroform in most cases comes without any premonition. The opportunity to procure it secretly seems to provoke the desire at once, and the odor of the drug is the first intimation the attendant may have of its presence. After the impulse dies out the desire for recovery and the efforts to this end are of the most energetic character. No one can be more earnest and seem to use every possible means to prevent relapse, and yet a secret opportunity to procure a bottle of chloroform and conceal it is always taken advantage of. In one case a clergyman under the strict care of a trained attendant, who urged and begged this attendant to watch him, and seemed to possess an almost insane desire to recover, and never gave the slightest suspicion of failure to aid in his recovery, bought and concealed several bottles of chloroform.

In the treatment this element of insanity must be considered, as well as the extreme liability to relapse at the most unexpected moments.

Death may suddenly come on at any inhalation. The complete removal of the drug is essential, and diversion of both nerve- and muscle-energy often a necessity in the treatment.

In a few cases under my care I have found physical exercise and daily baths of value. It is advisable to use massage, walking or gymnasium exercise sufficient to cause profuse perspiration, and this to be followed by prolonged baths. Tonics, alteratives, and concentrated food seem to be most useful.

When the case is not accustomed to other narcotics premonitory symptoms can often be distinguished which are seldom recognized by the victim. These are generally an irritative melancholy and restlessness, with depression which is not affected by advice or surroundings. Strychnine seems to increase these morbid sensations; chloral and cocaine have the same effect. The depression which follows large doses of bromide stimulates to a relapse after the first effects are over. Opium is an excellent remedy, but it must be concealed, as the danger of becoming an opium-taker is very great. Prolonged muscular exertion, with hot baths and massage, should be given, followed by 20 drops of deodorized tincture of opium in syrup of wild cherry or wintergreen, repeated every two hours until full sleep follows. After the patient wakes a Seidlitz powder or some active mineral cathartic will aid in relieving the nervous condition. Hot acid drinks are soothing, and may be given every hour. When the paroxysm has begun and stupor has come on, the patient should be put under the constant care of a faithful nurse. The effects of the inhalation should be treated with hot salt baths or sponging and the internal use of mineral acids. Coffee infusions are excellent for the headaches and depressions which follow. Lupulin and quinine have been given with good results. Arsenite of iron should be given, 1 to 8 grains twice a day. Five grains of iodide of potassium and 20 drops of fluid extract of conium at a dose may be taken three times a day.

The person should live with great regularity and be under the constant care of the physician. Food, baths, and exercise are of equal importance, and should not be neglected. The irritative depression which provokes the morbid impulse for chloroform is frequently associated with chemical changes of nutrient products before and after the paroxysm. In all probability, poisonous ptomaïne compounds are formed which materially embarrass the healthy nutrition of the body. Hence the need of special attention to foods, baths, and exercise, and active elimination by both the skin and bowels.

Chloroform-users can never become moderate or restrict themselves in the use of the drug. The inhalations are continued for days until the desire for sleep is broken up.

In some instances hot milk or food may be given with advantage

when the stupor from chloroform passes away. Later, this should be followed by the usual constitutional remedies, being always careful to conceal any narcotic, which otherwise may be used.

The prognosis is always grave, and while the patient may possess strong intellect and good physical vigor there is a neurotic element that imperils the future progress of the case.

In cases occurring in middle or later life there are often evidences of serious degenerations that are concealed. When the habit appears in early life, some condition of the surroundings and constitution may be the cause, the removal of which will be followed by recovery.

The employment of chloroform in hysteria or some of the convulsive neuroses is often followed by its continued use. Difficult questions arise in this connection that are rarely settled. While the other diseases may be cured, cure of the chloroform addiction is always doubtful, although active treatment should be continued to the end.

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## CHLORALISM.

This form of inebriety is more or less common among women, and is more particularly resorted to in the night for the purpose of producing sleep. Some previous neurosis will be found in all cases, and usually the beginning of the habit is a prescription for insomnia. The effects are so pleasant that it is repeated until it cannot be discontinued. Chloral can be taken secretly for a long time without any suspicion of its use.

When chronic insomnia suddenly ceases and the patient apparently recovers without some radical change of his living and surroundings, the use of chloral is presumable. In such a case after a time digestion begins to fail; the circulation is weakened; the heart's action is irregular; the inhibitory power of the various nerve-centres is lessened; and muscular unsteadiness comes on. If the person is past middle life a form of cardiac asthma, with a tendency to syncope, is present. These and other symptoms may go on to delirium and death. Not unfrequently a well-marked case of delirium tremens appears in one who has never used spirits and who is a secret chloral-taker. The usual trembling and delusions of persecution and the sight of loathsome animals are present. In most of the chloral-users a particular blueness of the extremities and nose is said to be marked. Marked listlessness and lack of energy are prominent in all cases, depending on the duration of the addiction.

Chloralism is confined largely to the better classes of society and to persons of a highly-organized and sensitive nervous system. The drug

can be disguised in many forms and is a fascinating sleep-producer. The amount taken varies from 20 to 200 grains a day. Alcohol is not a safe remedy in these cases, and when taken for relief of the dangerous symptoms often makes them worse; and Dr. Kerr has noted some cases in which alcohol was used in chloral intoxication with fatal results.

The result of the excessive use of chloral is to destroy the natural capacity for sleep, and after the removal of the drug the insomnia which follows is persistent and difficult to break up. Not unfrequently, an alcoholic will turn to chloral, but a chloral-taker will usually find relief in some form of opium.

The amount of chloral that can be taken daily varies greatly. It is possible for the person to use it for years at night without developing marked toxic symptoms; then suddenly extreme poisoning appears or a low form of delirium comes on, which ends fatally.

Sudden palsies and extreme vaso-motor disturbances and heart failure, with low grades of delirium, should suggest chloralism. In such cases baths, tonics, strychnine, and galvanism are indicated. These sudden, extreme symptoms are usually fatal, and the physician should never give encouragement, but advise all preparations necessary for a fatal issue. If these symptoms come on gradually the suspicions of chloralism should lead to the immediate isolation or quarantine of the patient, with tonic treatment.

The diagnosis of chloralism should be reached by exclusion, beginning with alcohol, opium, cocaine, chloroform, and other narcotics. The denial of the patient is of no value.

When chloral is found to be the drug taken, the treatment should be based on the facts of the case. Opium, chloroform, ether, and cocaine should not be used. Alcohol is always contraindicated. The milder narcotics may be taken after the chloral is withdrawn, but always with caution. Sulphonal, acetanilid, and similar drugs may be used safely. Often hyoscyamine, $\frac{1}{20}$ grain given in the place of the usual dose of chloral, is an excellent substitute. After a few doses it can be changed for some milder hypnotic, such as valerian or lupulin. The doses must vary with the case; usually double the officinal dose is required.

The removal of the chloral must depend on the vigor and character of the case. It may be done either at once or gradually. The chief reliance should be placed on baths, massage, and stimulating foods, such as beef-tea and hot milk. The recumbent position is essential for the relief of the heart, and the patient should be confined to bed for the first week. When the chloral is withdrawn the various preparations of nux vomica and strychnine are most useful. The insomnia and head neuralgias which follow may continue for months, and will require the most expert management.

Arsenic, in doses of $\frac{1}{20}$ grain four times a day, is valuable. Iodide of potassium, in 5-grain doses three times a day, combined with wild cherry, is also valuable. Showering and sponging of the head and spine will often control the insomnia and neuralgia, and should be given at night. The stomach in these cases is often more deranged than in alcoholics. Patients, if left to their own will, eat inordinately one day and abstain the next, or eat at irregular times, and often one form of food to the exclusion of all others. A well-cooked diet of beef or mutton twice a day, followed by a lighter meal in the early evening of some farinaceous foods, and served with regularity, is an essential part of the treatment.

To break up the effects of chloralism and prevent the patient from resorting to other drugs requires more persistent treatment than any other drug-addiction. When the habit is associated with the use of opium, cocaine, ether, or other drugs, the chloral should be abandoned at once and the other drug continued for a time.

Secret remedies for neurotic troubles very commonly contain chloral, and the use of these produces chloralism.

Secret chloralism has been mistaken for general paralysis, neurasthenia, hyperæmia of the brain, and several affections of the cord. Cases have come for treatment in which opium was supposed to be the only drug used, and later a chloral addiction was found to be more prominent. These mixed cases should be recognized and receive careful study before the exact plan of treatment is entered upon.

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## COCAINISM.

THE majority of cases of addiction to cocaine have had a previous period of drug-taking. Cases have been reported, however, in which cocaine was used from the beginning. Evidently, it was taken at first for its sedative effect, and found so pleasing and satisfactory that it was continued. In two cases under my care cocaine was used at first as an experiment to test its effects. As a result, both patients became cocaine-inebriates, and later, in the effort to break away from the drug, one resorted to alcohol and the other to opium. They recovered in an asylum, but with impaired health.

In all probability, the use of cocaine is increasing, particularly among drug-maniacs and neurotics, though its use is more or less concealed. Alcoholics and opium-takers not unfrequently resort in secret to this drug to cover up the effects of other drugs, and in certain cases the fascination growing out of its action on the nervous system is almost irresistible.

The coca-leaves from which cocaine is obtained have been the subject of a very bitter controversy in the past. Several times the Church has denounced coca as a "delusion of the devil," etc., and concentrated all its powers to prevent the natives of South America and others from using it, only to fail. The Spanish conquerors, like the natives, used it on all occasions to lessen fatigue and increase the power of nerve and muscular endurance. Miners of Potosi use it extensively for its stimulant and nutrient effects. From 1 to 3 ounces a day are chewed, the drug acting on the circulatory and nervous systems, producing elasticity of the muscles and a feeling of buoyancy. When the amount taken is in excess wakefulness follows. Coca is regarded as a preventive of hunger and thirst. Persons in South America who use it appear not to suffer from any ill effects. Much less food is taken while the drug is being used. Remarkable stories are told of the endurance of these persons. Many experiments have been made to obtain the same effects in other countries, without much success. It is stated that twenty-five million pounds of coca-leaves are consumed yearly, and that over ten million people are using them constantly. Yet the value of coca as a drug-food seems to be confined to the natives of the countries where it grows naturally. As a tonic it is valuable, but inferior to many others; the alkaloid cocaine is a sensory paralyzant of exceptional power. The various mixtures of coca wine are of more value for the alcohol which they contain than for any other substance. No case of coca-addiction has been traced to these preparations. While the various preparations of cocaine differ widely, the general effects are the same, except as to rapidity and duration of action.

The general effect in small doses, by the mouth or hypodermically, is a feeling of warmth and ease, accompanied by a soothing of all distress and pain. A sense of mental clearness and conscious command and control of volition, with muscular relief and rest, follows. All fear of consequences fades away in the consciousness of ability to control and shape events. A strong faith and buoyant hope pervade every thought and act. Old ideals or ambitions take on new forms and grow into near realities. Plans and conceptions or means and methods to accomplish any work rise above every conceivable doubt. Methods of overcoming all possible obstacles are more numerous and certain. The beautiful in nature and art and the rich fulness of life seem to pervade all waking thoughts. All this falls a little short of delirium. The brain retains its full consciousness of the realities and surroundings of life. Sleep comes gently and is without dreams. The heart-beat is slightly increased in force, the appetite is quickened, and all the functions of the body seem to approach an ideal standard.

These are some of the symptoms which follow from small doses in most cases. Later, after its use has reached toxic doses—from 5 to 30

grains—symptoms of poisoning appear. At the beginning of the habit the first stage continues many hours, then grows shorter, and merges into sleep. Then many of the following symptoms develop, according to the severity of the case: nausea, vomiting, and headache, or defective sight, hearing, taste, and smell, with sweats, chills, and cramps; the pulse is irregular and intermittent, and in extreme cases the respiration is difficult and labored, while a sense of suffocation and constriction about the chest is noticed. Articulation is husky and tremulous and the walk tottering. Sensation is diminished over all the body. With these symptoms there may be intense restlessness, prostration, faintness, and a feeling of impending death. The fatal symptoms are hallucinations, delirium, and convulsions, followed by paralysis.

The action of cocaine varies widely in different cases, and toxic symptoms may result from a small dose. Hence in a case in which the use of cocaine is suspected the sudden appearance of any of these alarming symptoms is evidence of its use. This is shown by the following case: A business-man of large cares who was extremely irritable and nervous suddenly manifested great coolness and composure under trying circumstances. He conducted his business with unusual clearness, but would fall asleep at his desk, and awake quickly and go on with his work. He became very pale and his breathing was disturbed; the pupils were dilated; he complained of his defective sight, and at times was extremely nervous. The heart seemed regular, the temperature was normal, and no symptoms of organic disease were present. His medical examiner diagnosed softening of the brain, but the patient refused to give up work. Two months later all these symptoms increased, accompanied by occasional nausea, extreme agitation, and difficulty in breathing and walking. An attack of acute pneumonia ended fatally in two days, and it was afterward discovered that he was a cocaine inebriate.

This is a typical case, but fortunately such cases are not common. The probability is that all cases which begin with cocaine quickly turn to opium and alcohol for relief from the alarming symptoms which follow.

The period of cocaine-taking may be very short, the alcohol and opium addictions which follow almost obliterating the memory of it; or the cocaine may be alternated with these drugs from time to time, especially when the person wishes to appear to great advantage for a short time.

The treatment of a cocaine inebriate is practically the same as that of opium and alcohol cases. There is a degree of brain-degeneration apparent in the morbid impulses and strange, uncertain mental action of these cases that approaches very near to insanity. Abrupt withdrawal of the drug is the safest plan, and reliance is to be placed on

bromides, foods, and baths to relieve the irritation and depression which follow. In the method of gradual withdrawal it has been found that small doses may result in collapse. In one case, in which 10 grains a day had been previously taken, and by gradual withdrawal the amount had been reduced to 3 grains, symptoms of heart failure and paralysis suddenly came on. The dose was increased and the patient recovered. In another case, complicated with alcoholism, the daily allowance of 7 grains was reduced to 4, when a violent collapse set in which was checked by giving the usual dose. The case finally became an alcoholic, but eventually recovered. The treatment of these mixed cases requires great care and watching, as they are especially liable to fatal collapse or to develop some form of acute brain disease.

Strychnine and the mineral acids are useful. Because of its rapid stimulant action strychnine, given hypodermically, $\frac{1}{40}$ grain every three hours, will often prevent collapse when the cocaine is withdrawn. Mineral acids, chiefly phosphoric, may be given in 1-drachm doses three times a day as a general tonic, unless contraindicated by an acid stomach. In these cases mental conditions approaching delirium are present. The functional disturbance of the heart and the emotional changes that are so prominent in the latest stages, and the uncertain co-ordination of both the higher and lower brain- and nerve-centres, all indicate the most serious disturbance. Some of the forms of iron, quinine, and strychnine may be very useful at the beginning of the treatment. Water containing bromide of sodium, 4 grains to the ounce and charged with gas, can be given freely for some time with good results.

The therapeutics must be governed by the conditions of the case. All cases should be treated in an asylum, where the physician can have the full control of the conditions and surroundings of the patient. Home treatment is difficult and unsatisfactory. The patient is always hypersensitive to pain and suffering, and will use deception and intrigue to avoid them. The will-power is of no assistance, and the success of treatment will depend on accurate study and observation of the case. Drugs are of little value; foods and hygienic care, including baths, will give the best results.

In all chronic drug-maniacs the physician should be on the look-out for cocainism. When cocainism is present a sudden addiction to opium, alcohol, chloral, or chloroform may arise, and in all cases the physician should be prepared for a sudden fatal termination of the case at any time.

## ARSENIC INEBRIETY.

THE use of arsenic as a stimulant is fortunately rare in this country, and only a few cases have been reported. Fowler's solution seems to be the form generally employed. The effects are exhilarant and narcotic, and the habit seems confined to women and to neurotics who do not use other drugs. In some reported cases arsenic was taken at first for the complexion, and continued for its tonic and pleasing effects. The pearly skin, brilliant eyes, and sudden changes in manner, emotions, and general disposition are characteristic symptoms. The face is full and plump, without wrinkles or lines, and the quiet air and general indifference of the person are different from those of all other drug-takers.

As in other cases, some neurotic diathesis most likely preceded the addiction to arsenic and favored the use of this or some other drug. In certain cases a peculiar tolerance to this drug will be found which favors its employment. In two cases under my observation the drug-taking was concealed. The peculiar clear color of the face and the appearance of health were marked. One, a man, claimed to have taken arsenic for ten years, beginning after an attack of typhus fever. He was much broken down in mind and body, and claimed that he wanted to stop its use, but could not do so. He took from 15 to 20 grains a day, and abandoned treatment after a short time without improvement. The second case was a woman who had used opium and changed to arsenic. She was demented, and probably took 10 grains daily. She gave up arsenic, used alcohol, and soon after died suddenly. In both cases a strong metallic odor was apparent in the perspiration. Such cases require very careful attention.

Inebriates have used arsenic for its stimulant effects, and at death this drug has been found in the stomach and tissues.

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## ETHER INEBRIETY.

THE use of cheap ethers as a beverage has been confined, so far, to distinct sections of the country. In the north of Iceland it has attained some prominence and has been the subject of medical study. In Wisconsin and Pennsylvania the sale of cheap sulphuric ether has been noted, and it has been asserted that a number of persons take it regularly. In Ireland it was found that ether was used because it is cheap, and the effects are rapid and very exhilarating and soon over, without any very marked depression. The exhilaration is very pleas-

ant and the sleep profound and free from dreams. Dr. Kerr and Dr. Hart of London, who have made a valuable study of this form of inebriety, affirm it to be the very opposite of opiumism. The use of ether makes a person happy, joyous, and exhilarant, while opium creates serenity, quietness, and a disposition to sleep.

To prevent the spread of the habit the English government promptly placed this form of drink among the active poisons, which makes it a severe penalty to sell it except for legitimate purposes. Beyond a few cases of inebriety from opium, alcohol, or other drugs, who turn to ether as a substitute, but little is known in this country of its effects. A case of this addiction may serve to illustrate the general symptoms: A man of leisure, who had been an alcoholic and was supposed to have reformed, suddenly manifested short periods of extreme exhilaration and hilarious joy, followed by a short stupor and a long period of reticence. Sometimes he would show a fighting disposition and be destructive if anything opposed his wishes. He was found to have taken from 4 to 8 ounces of sulphuric ether in divided doses with syrup of lemon. He continued to use this drug for two years at intervals, until the delusions which followed from the first stage of the ether remained through the free interval and grew stronger. He thought that his family were preparing to place him in prison for forgery and bigamy. He grew paler and his digestion suffered; he exercised excessively and was more and more hyperæsthetic. When he came under treatment the ether was cut off at once, and a few doses of bromide with cinchona and strychnine, strong foods, baths, and enforced rest, resulted in recovery. The man suffered from depression and melancholy for a year or more; then recovered fully and went to live in the country.

In another case, in which ether was used for three years following the abandonment of opium, its withdrawal developed acute mania.

Ether-addiction is always a dangerous and serious complication in cases of drug-addiction. The mind in such cases of necessity is more or less impaired, and the prognosis is very unfavorable.

The treatment will depend on the character and etiology of the case, and should be conducted upon the general principles which apply to brain palsy and irritation from chemicals.

The neurotic condition which would find relief from ether given for its medicinal effect should receive careful attention. The use of ether is not safe in alcoholic or opium cases, because of the tendency to change to it. In the same way, paraldehyde has been found dangerous: as long as it was given alcohol, opium, and chloral could be dispensed with, but when discontinued the demand for these drugs returned.

## COLOGNE-WATER HABIT.

In close connection with the forms of inebriety already described may be mentioned the use of cologne-water as a drink. Neurotics, especially women, will apparently recover from previous nervousness and seem better, but be surrounded by a strong odor of cologne. This will not excite any suspicion until later, when decided changes of conduct and emotions point to the use of some drug. Insomnia and nutrient disturbances will appear; then delirium and melancholy will follow. These cases are readily diagnosed by the intense odor of cologne on the breath, although this may be disguised by using it on the clothes. Obscure and complex nervous disorders in a person who employs cologne freely about the body would be strong evidence of its internal use. In all these cases the alcohol is of an inferior kind—often wood spirit—and is the real source of danger, as the essential oils present have but little influence.

These cases appear among persons of wealth and leisure, who soon fall into the habit of taking stronger spirits and opium, the cologne being still used to conceal the spirits. They are all, literally, alcoholics, and require the same treatment, and are likely to develop delirium and to have serious mental complications.

The external use of these odoriferous spirits by drug-neurotics is more or less unsafe, and in all asylums for inebriates is not allowed. The employment of these compounds freely among neurotics is always open to suspicion, and when taken internally the habit is as serious and difficult to treat as any other form of inebriety.

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## COFFEE INEBRIETY.

Some cases occur in which a marked craze for coffee exists. Anorexia, disturbance of the sleep, trembling of the lips and tongue, and headache are prominent symptoms.

Dr. Guelliot has published a very interesting study of 23 cases, 17 of which were in women. The patients had pinched, pale, wrinkled faces, a weak, rapid pulse, and the sleep was disturbed by anxious dreams. The following is the account of a typical case: A woman in middle life kept her pocket full of coffee, which she ate constantly. Her skin was of an earthy tint, constipation was obstinate, sleep very irregular, and her mind restless, anxious, and full of forebodings. She was much emaciated, and both the nervous system and digestion suffered severely at times. The lips and tongue were tremulous, dry, red, and

cracked. The appetite was very irregular, and vertigo, prolonged headache, and epigastric pain were present most of the time. She was placed under treatment and became delirious. Beef-tea, milk, baths, and a mild galvanic current were used for several weeks, and these were followed by bark tonics. She was discharged restored six months later.

As with tea-drinking, coffee-addiction is followed by the employment of spirits and other drugs. Many inebriates and opium-takers have a history of excessive use of coffee before the other drugs were taken. The recognition of addiction to coffee is important in many cases of neurotics, especially in children and young persons, and unless promptly checked will be followed by serious results. The excessive use of coffee in all cases is a very significant hint of nerve-exhaustion and disorder of the motor nerves.

In the late war many cases of delirium from coffee were noted where the food-supply was scant and coffee was abundant. Some of these cases came under special treatment, and yielded readily to baths, mineral waters, and strong foods. When coffee seems first to have been used for insomnia the treatment must depend on a careful study of the etiology, and from the removal of the causes the cure may be expected. I have also noted a number of cases in young children of inebriate and neurotic parents who developed a morbid impulse for coffee. Such cases require active treatment, and milk, mineral waters, and baths are prominent remedies. Neurotic disturbances and diseases from coffee are but little known.

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## TEA INEBRIETY.

THE excessive use of tea is followed by a chain of symptoms that should be recognized and understood. Of these gastric derangements, irritability, hyperexcitability, with changing neuralgias and hysteria, are common. In the cases reported a form of trembling delirium like that seen in alcoholics was noted. Muscular twitchings and delusions of fear and emotional excitement were also prominent. Most of the cases which reached this stage became addicted to chloral, opium, or alcohol, and abandoned the tea.

A case came under my care in which voices where heard at night and fears of sudden death caused intense and painful insomnia. It was found that the patient was chewing secretly half a pound of tea daily. Bromide of sodium and baths soon brought on recovery. The patient later became an opium-taker.

The largest number of cases are those who complain of insomnia

and extreme restlessness. Often they are unconscious of the effects of excessive tea-drinking, and attribute these symptoms to other causes. Such cases not unfrequently will be under medical care for some nervous disease, and be using in excess strong solutions of tea, which fact is concealed from the physician.

When this habit is found in women past middle life much difficulty will occur in the treatment, because it is often complicated with complex neurotic troubles. In early life it is symptomatic of a neurotic condition that requires most careful treatment. The greatest danger in these cases is the liability of some other drug-addiction following; also the great probability of relapse after the tea has been withdrawn.

In a family of three daughters and one son, all unmarried and in middle life, living together, an obscure form of delirium tremens broke out suddenly in all of them. A physician and two nurses attempted treatment at home, and it was some days before it was found that tea was the cause. They were taken to different asylums, and all recovered, came back, and relapsed. One of the girls resorted to opium, one died, and the other daughter and the son still continue the use of tea in comparative moderation, but are much impaired in both body and mind.

Tea inebriety of a less prominent type is more or less common, and should receive active treatment. Baths, electricity, foods, and careful attention to the surroundings are all important. Withdrawal of the tea should be followed by bromide of sodium at night in from 20- to 40-grain doses, according to the amount of irritation present. Hot baths and rubbing are very helpful to relieve the headache and depression. Mineral tonics, such as the potassium salts and carbonic-acid waters, are valuable. Fruit acids are particularly good tonics in these cases. The causes of the use of tea should be carefully studied and removed at the start. Prominent among the causes are headache and functional neuralgias, which are relieved by the narcotic effect of theine, the active principle of tea. It is claimed that tea acts on the cerebral centres, paralyzing sensation, and that it rarely affects motor areas unless it has been used to excess for a long time.

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## OTHER DRUG-ADDICTIONS.

In some parts of the country *gelsemium* has been used freely; several cases have been studied. The symptoms are paleness, emaciation, listlessness, delusions, and hallucinations. The treatment is by supporting remedies and abrupt withdrawal. Obscure cases of drug-

taking in some instances will be found to be cases of addiction to gelsemium. The drug is probably taken at first for the relief of acute pain, and its effects are so pleasing as to continue its use.

*Jamaica ginger* is used very extensively in all large cities. Cases of addiction to it are becoming more common. All these preparations contain cheap alcohols, and this forms the source of attraction. Such cases are inebriates, and require treatment similar to that of alcohol inebriety. Several of the ginger preparations contain from 10 to 40 per cent. of alcohol, and the effects of excessive use are the same as that from other spirits.

*Paraldehyde* is also used continuously by neurotics. Delirium and excessive prostration seem to follow its use.

These diseased appetites and manias for both food and drugs are all symptomatic of general brain irritation and exhaustion, and are matters of scientific study and medical care. The physician should rise above the levels of popular opinion, and treat them as great facts with distinct causations and distinct possibilities of cure and restoration.

# LOCALIZED SPASMS; LOCALIZED PALSIES; FACIAL HEMIATROPHY.

By F. X. DERCUM, A.M., M.D.

## LOCALIZED SPASMS.

Spasm (*Fr.* Spasme; *Ger.* Krampf) is an involuntary contraction of a muscle or group of muscles, and may be either clonic or tonic. It may affect almost any of the muscles of the body. More frequently, however, special groups or those representing special nerve-distributions are involved. Familiar examples of these are seen in the spasm of muscles supplied by the spinal accessory or by the facial nerve. In the limbs well-known clinical pictures are seen in the spasm observed in writer's cramp, hammer palsy, etc. In the eyes, again, spasms of the ocular muscles give rise to special conditions. These, however, together with the occupation neuroses, are considered elsewhere. Various localized spasms of the extremities are occasionally met with, but they are generally due to readily ascertainable causes, such as irritation direct or reflex or to hysteria. At any rate, they do not present themselves in the form of well-recognized clinical types, and do not warrant special description.

**Masticatory Spasm.**—Spasm of the muscles of mastication—that is, of the motor distribution of the fifth pair—is generally seen in association with tetanus. Here the condition it produces is known as trismus or lockjaw. Not infrequently it is observed, in the clonic form, in epilepsy or in the chill of beginning fevers. In a tonic form, again, it is occasionally met with in hysteria. Rarely spasm of the muscles of mastication is met with independently of any general affection, and for this reason it merits brief notice.

When existing as an independent and localized spasm, masticatory spasm is almost invariably due to some peripheral irritation, such as caries of the teeth, neuralgia, or other irritation of the sensory branches of the fifth. Occasionally lesion of distant parts, as the extremities, is followed by this curious trouble. More rarely it is to be ascribed to rheumatism, intestinal worms, or it is to be considered idiopathic.

The treatment consists in removing, if possible, the cause, and to this end the teeth especially, as well as the person generally, should be

examined. If a rheumatic cause be suspected, the treatment is of course to include the salicylates. If without assignable cause, electricity in the form of the constant galvanic current, moist heat in the form of large poultices, and counter-irritation back of the ears may be employed; and it should not be forgotten that the administration of a vermifuge is sometimes followed by the disappearance of the spasm.

The more important forms of local spasm are, as already indicated, those involving the facial and spinal accessory nerve-supplies. These we will consider in detail.

**Facial Spasm.**—Facial spasm, like other muscular spasms, is of two kinds—clonic and tonic; and this fact gives rise to two entirely different clinical forms. We will begin by considering the first.

Clonic Facial Spasm (*tic convulsif non-douloureux*) consists of an irregularly recurring, painless contraction of the muscles supplied by the facial nerve. This contraction may either be diffused over the various facial muscles or may be limited to certain groups. Thus, again, two clinical subdivisions arise. In the diffused form the symptoms are limited to one-half of the face, though it occasionally happens that even in cases otherwise one-sided certain movements, such as winking, are bilateral. In its onset the spasm does not affect all the muscles of the face simultaneously, but begins in one group and spreads to the others. There is, however, no regularity whatever in the order or sequence. Thus the mouth may be suddenly drawn up, the ala of the nose may twitch, or the eyes may blink, and thence the spasm spread until the whole of one side of the face is distorted by a meaningless grimace. The entire paroxysm lasts from a few seconds to a minute or even longer. The spasm rarely consists of a single muscular contraction, but is usually made up of a number of clonic movements, which quickly increase in rapidity until a maximum is reached, when they again become slower and gradually die away. Sometimes, however, the cessation of the paroxysm is very abrupt. Now comes an interval, relatively long in duration, in which the face is entirely or almost entirely quiet. The length of this interval varies greatly in different cases, and, though it may last several minutes in some, in others the paroxysms may recur so frequently and be so intense as to simulate a tonic spasm. In others, again, the interval, though quite long, is broken by brief and isolated contractions of individual muscles.

As a rule, spasm of certain muscles occurs more frequently, and in addition predominates over that of others. This is especially true of the zygomatics and the elevators of the angle of the mouth and of the nose. Next in frequency, and perhaps in intensity, comes the orbicularis palpebrarum. Less frequently the spasm starts in the depressor anguli oris. All of the muscles in the facial nerve-supply

may not be involved in the paroxysm; indeed, it is comparatively rare for some to be involved. Among the latter are the occipito-frontalis, the muscles of the ear, of the palate, and the platysma myoides. Not one, however, is absolutely exempt. Indeed, the spasm may even radiate to nerve-territories other than the facial. For instance, in rare cases the spasm has involved the masseters and temporals. In others, again, it has spread to the muscles of the neck, and even to those of the arms and shoulders.

No pain or other sensory disturbance accompanies the paroxysm. Occasionally, however, it is associated with neuralgia of the fifth, and sometimes with veritable *tic-douloureux*. In these cases it must be looked upon as something added to, or rather caused by, the disturbance in the fifth. Uncomplicated facial tic is painless.

Further, though the facial muscles be ever so severely attacked by the disease, no weakness or paresis of any kind can be detected in them. The electrical reactions too, as far as they can be studied, appear to be normal.

The *limited* form of facial spasm deserves separate consideration, because of the differences presented in the clinical picture. Instead of a widely-spread contraction involving all or nearly all of the muscles of one side of the face, one muscle or one group of muscles is subject to a constantly recurring spasm. The affection, too, is apt to be bilateral. Thus the zygomatics of both sides may be involved, and at short intervals a grin or a smile passes over the patient's face. At other times it is the corrugators that are affected, and the patient frowns every little while without cause. No emotion, of course, is attached to this frowning. More frequent than either of the foregoing forms is that in which the orbicularis palpebrarum is involved. The affection may be very slight or severe. It may be so slight as to cause but a barely noticeable twitching of one eyelid, or the eyes may suddenly close and immediately open as in winking. Indeed, this form is frequently spoken of as *spasmus nictitans*. Transient contractions of neighboring muscles, the corrugators, the frontalis, or even the zygomatics, may be associated with it. This form is sometimes classed as a habit spasm, is not infrequently seen in children, and may be mistaken for chorea.

The spasm of the orbicularis may take a severe form, so that the contraction lasts a very appreciable period of time, varying from several seconds to many minutes. *Blepharospasm*, as it is termed, though essentially a clonic spasm, may be so severe as to be practically continuous—may really merge into a tonic contraction—and it may recur so frequently as to make the patient, to all intents and purposes, blind. During the spasm the lids may be so firmly closed that by no effort of will can the patient open them.

Curiously enough, it has been found—and the patient himself may make this discovery—that in some cases pressure with the finger upon certain points causes cessation of the spasm. This is especially true of pressure upon the supraorbital notch or upon the course of the supraorbital nerve higher up. In some cases the pressure-points are found upon the infraorbital branch of the trigeminus, or, indeed, the locality of the points may bear no relation to the fifth nerve whatever. Thus they have rarely been found on the back of the neck, and more rarely still on the shoulders, in the axilla, and on the arm as low down as the wrist. These pressure-points, it should be stated, are also occasionally found in the diffused form of facial spasm.

The course of facial spasm in either the diffuse or clonic form is essentially chronic. In children, especially if it take the form of the mild mimicry or habit spasm so often observed, recovery follows improvement of nutrition and mental and moral training. In adults improvement, rarely recovery, may occur. More frequently, however, the spasm becomes more and more confirmed with time.

Chronic diffuse facial spasm and blepharospasm are so striking in their appearance that an error in diagnosis is barely possible. However, we should be on our guard against mistaking some of the milder forms, especially as they occur in children, for chorea. This error it is important to avoid, as, other things being equal, the prognosis in chorea is so much better than in facial spasm. Further, each case should be thoroughly studied, so as to determine, first, whether the spasm is general or limited; secondly, whether there be any source of peripheral irritation; and lastly, to exclude organic disease of the nerve-trunk or of the structures through which the nerve passes or to which it is contiguous.

Treatment.—As a rule, cases that present themselves for treatment are already well established, and thus have attained a certain amount of chronicity. Notwithstanding, the mouth, the teeth, the eyes, and the nose should be carefully examined, and any diseased state that is discovered promptly placed under treatment. Next, the fifth nerve should be thoroughly explored throughout its various divisions. The result proving negative, the entire body should be gone over, especially in children, and if, as a final result, nothing is found, the intestinal tract must not be forgotten. As already mentioned, it is possible that in some cases worms are the cause.

Locally, counter-irritation by blistering or burning a small area high up over the cervical spine or back of the ear may be tried. Occasionally a slight though temporary improvement follows. Freezing of the face has also been tried with a similar result. The constant galvanic current is also said at times to influence favorably the spasm, but the result, in the writer's experience, is so discouraging as to make

a trial scarcely worth while. Stretching the facial nerve is an expedient which yields a decided though temporary success. Just as soon, however, as the ensuing paralysis disappears the spasm reasserts itself, though the patient may have relief for many weeks or even months. Section of the nerve-trunk yields a similar result, though the relief is apt to be of longer duration. As soon, however, as union takes place the spasm recurs. An interesting and rather remarkable illustration of the results of section of the nerve is furnished by a patient that I had the opportunity of seeing through the kindness of Dr. Keen. In this instance the nerve had been cut a number of times in succession. After each section facial paralysis was established, but in the course of several months or a year the annoying spasm returned, and lasted until again dispersed by a new operation.

Internally, various drugs have been used without curative result. Indeed, of all of them only one has an ameliorating effect that can be regarded as decided. This is morphine. When used internally, or, better still, when injected hypodermically into the face near the exit of the nerve, it markedly lessens the spasm. However, its repeated or continued use leads inevitably to the opium habit. Good effects have been claimed for belladonna. Gelsemium, of such decided use in spasmodic torticollis, is of less value here, but it deserves a more extended trial. General tonic treatment and liberal living are also of course indicated.

It occasionally happens that a case of very recent origin is placed in our hands. Should a search for some source of peripheral irritation prove fruitless, and especially if the patient presents the symptoms of a recent cold, free purgation, sweating, counter-irritation by means of a blister back of the ear, warm bandaging of the face, and absolute rest should be thoroughly tried. Again, if there is reason to believe that the patient is rheumatic, salicylates should be administered in large doses.

Finally, in every case pressure-points should be carefully sought. The amount of relief which the patient can thus obtain is often considerable, especially in blepharospasm.

Tonic Facial Spasm differs both clinically and pathologically from the clonic affection. Instead of constantly-recurring changes in the facial muscles, the latter remain fixed and immovable. Almost invariably the affection is limited to one side. The contrast between the two halves of the face is therefore very marked. Not only does the affected side refuse to take any part in the play of expression as seen on the healthy side, but it is continually distorted. Thus, the angle of the mouth is drawn upward or retracted, while it is apt to close firmly. The palpebral fissure, due to spasm of the orbicularis, is narrowed, and the eye therefore seems smaller than its fellow.

In addition, the eyebrow is apt to be raised. The expression suggests a grotesque and exaggerated one-sided smile. The muscles are hard and resistant to the touch. The spasm may, of course, be limited in its distribution, but it is not apt to be so. Occasionally the zygomatics and elevators of the mouth are more decidedly affected than the other groups.

Tonic facial spasm is most frequently seen as an after-result of Bell's palsy. The muscles having been paralyzed for a long time, secondary contracture supervenes, just as it does in the arms and legs of hemiplegics. Occasionally, in hemiplegics in whom the face has been decidedly and persistently involved, the mouth becomes permanently retracted, due to the same cause. The orbicularis palpebrarum of course remains free.

Not every tonic facial spasm, however, is due to secondary contracture. Very rarely it is said to follow directly exposure to cold. Occasionally it is an accompaniment of hysteria. In paralysis agitans, also, it must be remembered, the mask-like expression of the face is due to tonic spasm of the muscles of both sides.

*Treatment*, especially in the form due to secondary contracture, is quite thankless. The constant galvanic current may be used, but the results are rarely of any value.

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## SPASMODIC TORTICOLLIS.

Spasmodic Torticollis, spinal accessory spasm (*tic-rotatoire*), consists of a spasm of certain muscles by which the head and neck are forcibly rotated to one side or from one side to the other. The majority of writers have described this affection as spasm of the muscles supplied by the spinal accessory nerve—namely, the sterno-cleido-mastoid and the trapezius. It is, however, well known that the spasm, in nearly all cases, is not confined to these muscles, but involves a great many others. Owing to the relatively large size of the sterno-mastoid and trapezius the character of the rotatory movement is largely influenced by their action, and is modified according to whether the one or the other predominates; but it is equally true that rotatory spasm of the head may obtain without either of them being involved. This is seen in pure and uncomplicated cases, and explains the frequent failure of section or exsection of the spinal accessory nerve to arrest the spasm.

The movements which occur in this disease are characteristic. Every minute or fraction thereof the head is forcibly turned to one side or slightly turned and forcibly drawn backward and downward.

If the action of the sterno-mastoid predominates, the head is rotated as follows: The chin is carried toward the opposite shoulder, and somewhat elevated; the mastoid process is carried downward, and the occiput is drawn somewhat backward. If the trapezius predominates, the occiput is drawn backward and the head somewhat tilted toward the affected side, and at the same time slightly rotated. Together with this the scapula is partly elevated, much as in shrugging the shoulder.

Instead of either muscle predominating, both may be affected to an equal degree. In such case the resulting movement is one in which rotation is quite marked, while the pulling back of the head and elevating of the shoulder are equally pronounced. As a rule, the spasm of the sterno-mastoid can be readily seen. Not infrequently this muscle stands out prominently, and becomes very hard to the touch. Occasionally it undergoes marked hypertrophy, so that even in a state of rest its swollen condition is very noticeable. The location and shape of the trapezius render changes in its condition less striking, but by placing the fingers upon it, especially during a spasm, it is discovered to be hard and firm. In character the spasm varies very much. Sometimes it consists of a succession of jerky contractions, during which the head is but slightly moved about. At other times it is more continuous, so that the head is drawn slowly back, while the chin sweeps gradually to the opposite side. In well-marked cases the movement is of wide extent, the torsion of the head and neck reaching a maximum. In others, again, the displacement is but partial. Rarely the spasm assumes a tonic character, so that the head is held more or less fixedly in one position for many minutes together. In the large majority of cases it is the muscles on the right side that are involved.

The intervals between the attacks of spasm are relatively long, and are usually periods of complete or almost complete rest. At times, however, they are so short that the contractions appear almost continuous. As a rule, all spasm ceases during sleep, but occasionally this is seriously interfered with, the patient's head rolling ceaselessly to and fro on the pillow.

Disturbances of sensation in the form of dull pain in the affected muscles are frequently present. This pain is referred, as a rule, to the upper part of the trapezius and sterno-mastoid, and frequently to their areas of origin on the occiput and mastoid process. It is not improbable that this pain is the result of fatigue. Occasionally pain is referred to the cervical, and sometimes the dorsal, spine, and in these regions the spine may also be sensitive to pressure. Rarely pain is referred to the upper part of the right arm. Tenderness, it should be stated, has in a few cases been found over the spinal accessory nerve.

Among unusual features of spasmodic torticollis must be mentioned involvement of the facial muscles, of the muscles of mastication, of the platysma myoides, and of the arms. Among the more frequent features are involvement of the splenius, the scaleni muscles, and the numerous deep rotators of the skull and cervical spine.

Pressure-points, such as are found in facial spasm, are rare in torticollis. When found, they are said to be over the spinal accessory.

Spasmodic torticollis may come on suddenly, but more frequently it is gradual in its onset. Sometimes it is preceded by vague pain and stiffness in the back of the neck and in the muscles, or by vague sensations in the head.

TREATMENT.—A variety of drugs have been used in the treatment of this disease, the greater number without definite result. Among these may be mentioned the bromides, belladonna, hyoscyamus, and cannabis indica. Although of occasional asserted benefit, they are scarcely worth a trial. Morphine, however, as in facial spasm, has been found to give very decided relief. The spasm always diminishes, and sometimes ceases entirely, during its use. Gowers cites the case of a man in whom relief was obtained for a period of ten years through the habitual use of a moderate dose of the drug. The morphine habit, however, is the inevitable outcome of this treatment, and for this reason its use should never be entered upon without serious consideration. Only in cases in which the spasm is so severe as to be almost constant, is associated with pain, and dangerously interferes with sleep should its habitual use be countenanced.

Fortunately, there is another drug which, while it does not give the almost absolute relief afforded by morphine, is yet followed by most decided mitigation of the symptoms, and this, too, without the formation of any baneful habit. This drug is *gelsemium*. Like many other valuable therapeutic measures, we owe its use in torticollis to Weir Mitchell. In large doses it is of course a poison, and its use should always be attended with care. It may be given in the form of the fluid extract, beginning with 5 drops and at intervals of several hours; four hours is a convenient interval, as the effect of a single dose lasts from three to four hours. Gradually, drop by drop, the dose should be increased to 10, 15, or even 20 drops. Twenty drops, indeed, should be considered the maximum dose, and should not under ordinary circumstances be exceeded. During its administration the patient should be watched, and if ocular symptoms, such as double vision, make their appearance, it should be for a time discontinued. It seems that by beginning with a small dose a certain degree of tolerance is established, and that by increasing the amount very gradually a much larger quantity can eventually be administered. I myself have given in this manner as much as 20 drops of the fluid extract every three hours for

many days at a time without any other signs of toxic action than a slight feeling of languor. During the use of the drug the spasm diminishes to a very marked extent, and in some cases almost ceases, though I believe it has never been known to do so entirely. However, so pronounced is the amelioration it affords that it adds very materially to the comfort of the patient. Further, in the experience of the writer the improvement continues for some time after the drug has been discontinued. Very persistent improvement, indeed, may be looked for if, in addition to the gelsemium, the patient is put to bed and a thorough course of rest treatment instituted. As is well known, the affection not only occurs most frequently in women, but in women who are decidedly neurasthenic. General weakness, nervousness, and a tender spine are the rule rather than the exception, and should certainly influence our treatment of this most troublesome affection. The rest in bed alone favors amelioration of the spasm, as does also the improvement of nutrition, the increase in weight and of general nervous tone.

Among local measures electricity has been used in the form of the constant galvanic current with some benefit, but never with any persistent result. It is surgery, however, that has been appealed to most often to give relief. In a large number of cases the spinal accessory nerve has been cut or stretched, and in a case of my own it has been exsected as far as accessible. Cures have been said to follow this treatment, but we are strongly warranted in the assumption that cases reported as cured are reported prematurely. In every instance in the observation of the writer the spasm, after a few weeks or months, returned, sometimes, indeed, after a few days. A striking illustration of the uselessness of surgical interference—at least of its failure to cure—is furnished by a patient of the writer's in whom the nerve was first cut, and then, at a subsequent operation, exsected, each operation having been followed by only a temporary cessation of the spasm. The spasm seemed somewhat less severe after the second return, but certainly there was no marked change. Finally, a third operation was undertaken. Dr. Weir Mitchell had suggested that in these cases the nerves supplying the deep rotators of the head be cut as well as the spinal accessory. In accordance with this suggestion, Dr. W. W. Keen devised an operation for cutting and exsecting the posterior divisions of the first three cervical nerves, and carried out the procedure successfully on the patient in question. As after the preceding operations, the spasm ceased for a time and the patient returned home. When last heard from, however, the spasm had recurred, but to what extent and with what severity it is impossible to say. Our experience in this case shows, there can be no doubt, the futility of these operations. When we reflect, too, upon the number of the muscles engaged in the single

movement of rotating the head and neck, and upon their inaccessibility, the cause of failure becomes apparent. In addition to the trapezius and sterno-mastoid, we have the following muscles taking part: splenius, rectus posticus major, rectus posticus minor, trachelo-mastoid, complexus, obliquus capitis superior, obliquus capitis inferior, semispinalis, semispinalis dorsi, multifidus spinæ, and, at times, even others. This review shows the hopelessness of securing absolute or permanent relief by any operation on the peripheral nerve-trunks. The recurrence of the spasm after these operations points more than ever to a cortical origin of the trouble, and it becomes a question whether in a severe case the operation of trephining and excising the centre for rotating the head should not be performed. The centre is very accessible—occupies the posterior portion of the middle frontal convolution, and in part also the posterior portion of the superior frontal—and, as in other operations upon the motor cortex, the accuracy of the localization could be confirmed by faradization. Certainly, severe cases are met with in which this procedure should receive full consideration.

Before leaving the subject it should be mentioned that various mechanical appliances have been contrived for restraining the movements of the head. They must be devised to suit each individual case. As may be conjectured, they answer the purpose indifferently.

**Bilateral Spasm of the Muscles of Rotation** deserves brief mention. It comes on almost exclusively in children, and as the result of dental irritation. If the muscles of the two sides act simultaneously, there is a movement as of bowing the head, which is repeated at more or less short intervals. If the muscles of the opposing sides act alternately, the head is constantly rolled from side to side. Pain does not accompany the affection, but the sight is often very distressing to the bystander, and occasionally a very brilliant and happy result is achieved by merely lancing the gums. If this measure fails or is contraindicated, other peripheral irritation should be sought for, attention being of course paid to the intestinal tract.

**Tonic Spasm of the Muscles of the Neck** affects chiefly the sterno-mastoid and trapezius. The head is held fixedly in one position. The neck is, as a rule, bent to one side, while the occiput is drawn backward and depressed and the whole head somewhat rotated. The position varies as the action of the trapezius or sterno-mastoid predominates.

The affection may be the direct result of irritation of deeper structures, such as disease of the cervical spine or of the meninges. Of course, concomitant or later-developing symptoms would in such case be present. Occasionally the cause cannot be made out. It must not

be confused with ordinary rheumatism of the muscles, the "wry neck" of the laity. It is not improbable, however, that it may be due to rheumatic irritation elsewhere.

TREATMENT.—This must be guided by the cause if the latter has been ascertained. In addition, counter-irritation over the cervical spine by the actual cautery or blisters may be employed. If the case fails to yield to treatment, the tendons of the muscles should be cut and the head secured in a normal position by means of a properly constructed apparatus. Extension of the cervical spine may here be practised with advantage. If the surgical interference be neglected or too long delayed, the head may become permanently fixed in an abnormal position.

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## LOCALIZED PALSIES.

A LOCAL palsy is one in which a group of muscles answering to a single nerve-supply is paralyzed. Hence local palsies are as numerous as the nerves themselves: we shall therefore consider them, with one exception, in general. The recognition of any individual form will depend largely upon the anatomical knowledge of the physician. Care, however, is necessary to establish the diagnosis of a *local* palsy. To this end the limb in which the palsy is seated should be carefully examined to determine whether additional muscles or muscles of other groups are involved. Next, the opposite limb, and, in fact, the entire body in doubtful cases, should be studied so as to exclude more general and multiple palsies.

Local palsies, in the vast majority of cases, are peripheral in their origin, and depend upon some lesion involving the nerve-trunk supplying the muscles in question. Of course palsies limited in their distribution may be of cortical or spinal origin as well as peripheral, and it behooves us, therefore, in a given case to diagnosticate the seat of the trouble. In the first place, in differentiating between cortical and spinal paralysis we must bear in mind that in the latter we have nutritional changes in the muscles which come on early and which are absent in the former. Thus in spinal paralysis changes in the electrical reactions as well as in the bulk of the muscle soon supervene. At first the paralyzed muscles react more readily than usual to the electrical stimulus—*i. e.* there is quantitative increase. Later on it reacts less readily than normal and we have quantitative decrease. Finally the familiar picture of the reaction of degeneration is presented: the contraction upon anodal closure of the galvanic current gradually becomes more, and the contraction upon cathodal closure

less, pronounced, until finally the normal relation is exactly reversed, and the muscle responds more readily to anodal than to cathodal closure. At the same time the response to faradic stimulation is lost. While this is going on the muscles begin to suffer a gradual diminution in size. As regards cortical paralysis, we should remember that unassociated with other symptoms of encranial disease it is very rare, and, lastly, that it still more rarely complies with our definition of a local palsy in that the paralysis should follow a single nerve-distribution. Limbs and segments of limbs are represented in the cortex rather than muscles or muscle-groups.

In differentiating between paralysis due to spinal-cord disease and that due to disease of the nerve-trunk we should remember that wasting and reaction of degeneration are present in both. However, two or three points remain to assist us in our diagnosis. In the first place, if the nerve-trunk be involved, there is almost always tenderness or pain upon pressure over its course. Secondly, the paralysis generally involves the whole of the nerve-distribution in question—is rarely if ever partial. Lastly, if the nerve-trunk be decidedly involved, and it be a mixed nerve, some disorder of sensation, anæsthesia more or less pronounced, tingling and pain along its course, and in severe cases even trophic changes in the integument or its appendages, may result. The latter occurrence is, however, infrequent.

A very familiar instance of local palsy is that afforded by one-sided wrist-drop. The patient commonly presents himself with the history of having slept with the head resting upon the arm and of finding the arm paralyzed upon awakening. As the patient stands before us the most striking feature is his inability to extend the wrist. A glance tells us that this is limited to one side, and that, therefore, the case cannot very well be one of lead-poisoning. Examining the case a little more closely, we find that all of the extensor muscles of the forearm, including the supinator longus, are paralyzed. Frequently, also, there is paralysis of the triceps extensor. Evidently, we have here a paralysis in the distribution of the musculo-spiral nerve, and on carefully examining the nerve-trunk itself, we are apt to find it sensitive to pressure—sometimes painfully so—just as it curves around the lower third of the humerus beneath the head of the supinator longus. At times also there are numbness and loss of sensation along the distribution of the radial nerve. If the case be a mild one, the paralysis is transient and may disappear in a few days. More frequently, however, it is persistent, and electrical changes begin to manifest themselves in the muscles.

Unilateral wrist-drop from pressure constitutes, then, a typical example of a local palsy. As said before, any nerve-distribution may be the seat of such a palsy, no part of the body being free

from trauma. If trauma be absent, it should be borne in mind that rheumatism not infrequently attacks individual nerve-trunks, and that in such cases internal treatment materially facilitates recovery.

**Bell's Palsy.**—Among local palsies one form deserves special mention, and that is *Bell's palsy* or *complete facial palsy.* It is indeed a very common form of local palsy, occurring in the writer's experience a little less frequently than the unilateral wrist-drop just described. Facial palsy may, as is well known, be of central as well as of peripheral origin. It is a very frequent accompaniment of hemiplegia, and so occurring it is of course not a local palsy. However, its occurrence in hemiplegia is always partial; that is, the entire distribution of the facial nerve is never involved—merely the muscles about the lower part of the face, notably the mouth. The orbicularis palpebrarum is always intact. The patient is able to close the eye upon the paralyzed side as well as upon the sound side. In peripheral facial palsy the reverse obtains: the orbicularis palpebrarum is always involved. The appearance of the face is in consequence very striking. The eye on the affected side is wide open and takes no part in the movement of winking. It remains open persistently, and by no effort can the patient close it. Occasionally, if the paralysis be not total, the palpebral fissure can be narrowed by effort, but never closed. In addition, the mouth is drawn to the opposite side. The normal wrinkles and folds of the face disappear. The brow is unnaturally smooth, the cheek flattened.

Not only does peripheral facial palsy differ from central palsy in that it is complete, but sooner or later electrical changes are noticeable in the muscles and become more pronounced until the reaction of degeneration is fully established. This, of course, never occurs in the central form.

The symptoms of the peripheral form are present either in disease of the facial nucleus or of any portion of the nerve-trunk. Consequently, it becomes necessary to differentiate the various kinds of "peripheral" facial palsy from each other. In the first place, a lesion of the nucleus is most frequently a co-result of disease involving other structures. Thus other symptoms are present which at once remove the case from the category of local palsies. The associated symptoms are generally paralysis of the extremities on one side, which, if the lesion be high up in the pons, may be on the same side as the facial palsy; if lower down, crossed paralysis is present, the hemiplegia being on the opposite side of the body. In contradistinction to the facial palsy from disease of the capsules we must remember that the paralysis is complete—that it involves all of the branches. Finally, facial palsy dependent upon lesion within the pons may also be associated with disease of other cranial nerves. Disease of the root of

the facial nerve is therefore to be differentiated from disease of its trunk by the evident and often extensive involvement of other structures.

Lesions of the nerve-trunk can be conveniently divided into those which occur within the cranium, including the internal auditory meatus and the facial canal, and those which occur without the cranium. If the nerve be affected previous to its exit from the stylo-mastoid foramen, various symptoms are added to those of paralysis of the branches supplying the face. Thus, if the nerve-trunk be interfered with as it lies at the base of the skull and in its passage through the internal auditory meatus, disturbance of hearing may be added. This may take the form of exaggerated functional activity, auditory hyperæsthesia, or marked impairment of hearing, and even complete deafness. It is not difficult to understand how the two nerves, the auditory and the facial, lying side by side at the base of the brain and in the internal auditory meatus, may be affected by the same lesion. Deafness associated with facial palsy may thus be readily explained. The hyperæsthesia, too, which is sometimes met with may be explained by irritation of the auditory nerve due to its contiguity to the diseased facial; or it has also been suggested that the increased sensitiveness to sounds may be due to the paralysis of the stapedius muscle, which leaves the tensor tympani (supplied by fibres from the otic ganglion) unantagonized.

In addition to the auditory symptoms and paralysis of the muscles of expression, we may also have paralysis of the soft palate on the affected side. If this paralysis exist it is proof that the facial nerve is diseased either at the base of the brain, within the internal auditory meatus, or at the position of the geniculate ganglion (intumescentia gangliformis). At the geniculate ganglion, it must be remembered, the facial nerve is placed in communication with the spheno-palatine ganglion through the great superficial petrosal nerve. The spheno-palatine ganglion in turn supplies the muscles of the soft palate.

If the facial nerve be involved in its further course through the Fallopian canal, we have symptoms due to paralysis of the chorda tympani—namely, diminution or abolition of the sense of taste in the anterior two-thirds of the tongue on the affected side, and diminished secretion of saliva.

If the nerve be diseased just previous to its exit or at its exit from the stylo-mastoid foramen, we have merely paralysis of all the branches going to the muscles of expression.

The important point in the diagnosis of peripheral facial palsy is its differentiation from central palsy by the involvement or non-involvement of the upper branch of the facial. The patient should therefore always be requested to close the eyes: if the case be peripheral, the orbicularis palpebrarum of the sound side alone will respond, the other

eye remaining open. At times the orbicularis of the paralyzed side responds slightly, but any involvement whatever, it should be remembered, determines the case to be peripheral. (Complete centric facial palsy is said very rarely to occur, but if this be true the lesion is so widespread that hemiplegia and other symptoms are inevitable.) Having diagnosticated peripheral palsy, the next step is to examine the sense of hearing, the soft palate, and the sense of taste. This is important, as establishing the involvement or non-involvement of the encranial portion of the nerve.

TREATMENT.—If the encranial portion of the nerve be involved, various special indications in treatment may arise. Thus, if a local meningitis be suspected, alteratives, the iodides and mercurials, with counter-irritation to the back of the neck, may be required; or if middle-ear disease be diagnosticated, local treatment of a special character, blistering back of the ear or even trephining of the mastoid cells, may suggest itself. The indications must be met as they arise.

If the extracranial portion of the nerve be involved, internal medication or counter-irritation is not indicated. Certain it is that it produces no very marked results. Local treatment by means of electricity seems to do the most good. It undoubtedly aids recovery. Special rules for its employment cannot be laid down. If it be found that the muscles have ceased to respond to the faradic current, the galvanic current should be employed, and of such strength as will cause very perceptible contractions in the muscles. Its utility is undoubted, and it should be employed in every case. Of course, if secondary contracture has set in, no treatment is of any appreciable service. The constant galvanic current is indicated, but the writer has failed to see any tangible result from its use.

It should be mentioned in this connection that in severe cases of facial palsy which recover the muscles respond to the stimulus of the will long before they respond to the faradic current.

What has been said here of the treatment of facial paralysis applies also to the treatment of other local palsies. Electricity is to be persistently used, and it is well to remember the rule laid down by Dr. H. C. Wood regarding the choice of the current. The rule is simply to use that current which gives the most ready response with the least amount of pain to the patient. Internally also strychnine may be administered, or, what is still better, small doses of strychnine, $\frac{1}{200}$ to $\frac{1}{100}$ grain, may be injected directly into the muscle. In addition, the muscles, and, in fact, the entire limb in which the palsy is found, should be thoroughly treated by massage.

## FACIAL HEMIATROPHY.

FACIAL HEMIATROPHY is a remarkable affection, in which there is a gradual wasting of the skin, connective tissue, muscles, and bones of one side of the face. Fortunately, the disease is quite rare. It usually begins by a small area of the skin of the cheek becoming paler than the surrounding surface. Sometimes there are several such areas. The whitish appearance of the spot persists, and soon it is noticed that the skin is smoother and thinner than elsewhere. Soon it becomes depressed, and gradually the subjacent tissues become involved. The wasting progresses steadily. Skin, fat, muscle, and bone gradually and mysteriously disappear. After a while the face becomes much sunken in, both the upper and lower jaws suffering. The skin becomes yellowish, brownish, or mottled in appearance. It is dry, and sooner or later the hair or beard on the affected side falls out or changes in color. If the process continue the teeth loosen and drop out. The muscles of expression, however, are frequently well preserved. Gowers, indeed, says that the muscles seem to undergo little or no change. In this respect, however, he is not in accord with other writers. Not only is there very evident involvement of the facial muscles at times, but there is in addition occasional atrophy of the soft palate on the same side, hemiatrophy of the tongue, and even of the muscles of mastication. In all stages of the disease, however, the muscles respond normally to the electrical currents.

Curiously enough, the cutaneous sensibility remains unimpaired in the majority of cases. Numbness, probably subjective, is occasionally complained of. However, it should be stated, neuralgic pains, stinging sensations, or other sensory phenomena are present at times, and are referred to the branches of the trigeminal nerve. More frequently these symptoms precede rather than accompany the affection. The temperature of the affected side has in a few instances been observed to be slightly lower than that of the sound side. Finally, in a case studied by Virchow there was concomitant atrophy of the shoulder and upper part of the arm on the affected side.

The contrast between the two sides of the face is very great, and the diagnosis in the average case is readily made. Chronic muscular atrophy and facial palsy with secondary contraction present such tangible differences that it is not necessary to discuss them. The same is true of marked facial asymmetry of congenital origin. In all of these instances there is an absence of trophic changes in the skin, connective tissue, fat, hair-follicles, etc. In fact, error in diagnosis is possible only in the *early stage* of the disease, and here care is required. It is important to establish the nature of the mysterious white spot on the cheek. It is not unlike a patch of vitiligo in some of its peculiari-

ties. However, in vitiligo the patches are relatively large, not infrequently numerous and coalescent, and show an increase of pigmentation at their edges; especially, however, is there an entire absence of wasting of the skin, the level of the patch being the same as that of the surrounding surface. In alopecia areata the distinction is to be made on the same lines. The hair falls out, it is true, and the surface is dry, but it is either on a level with the surrounding skin or actually somewhat raised: it is only in the later stages that it is somewhat depressed. Then, other factors, such as the history of the case, the location of the patch on the bearded portion of the face, the occurrence of other patches upon the scalp, assist in the diagnosis. Finally, it is barely possible that in rare instances the differences between this affection and morphœa occurring in the distribution of the trigeminal would have to be considered. It is well known that morphœa in its later stages sometimes undergoes atrophic changes which may involve not only the skin, but also the subcutaneous connective tissue, fat, and muscles. Here, again, general principles must guide us. The case must indeed be rare in which the diagnosis is doubtful.

Facial hemiatrophy is essentially chronic. Cases have been observed for many years in succession. Whilst the disease is generally progressive, it not infrequently remains stationary for long periods, or the atrophy may cease to spread altogether. Recovery does not take place. The only hope of the patient is that the process may be spontaneously arrested.

Regarding the causes of this strange disease, our knowledge is in a very imperfect condition. The following facts are, however, in our possession: The affection is not hereditary. It occurs most frequently in childhood and early adult life. More females than males are attacked. The left side of the face suffers more frequently than the right. It has been observed to follow measles, scarlet fever, whooping cough, exposure to cold, and falls or blows upon the head. Sometimes it is preceded by or associated with epilepsy. The general health of the patient is good.

TREATMENT.—Up to the present time no treatment has been proposed for this affection that has yielded any definite result. This is true alike of electricity, massage, and internal medication. The outlook of the patient as regards recovery has always been considered hopeless. The only consolation that has been held out to him was that the disease would some day be spontaneously arrested—certainly a meagre satisfaction when we reflect that arrest does not take place, in the majority of cases, until the deformity has attained very great proportions. It is certainly anything but a pleasant prospect to know that the disease may not be arrested until the entire cheek is sunken, the jaw

gone, the teeth lost, and the nose fallen to one side. Assuredly, if anything can be done to arrest this distressing result, it should be attempted.

In view of these circumstances the following somewhat radical expedient has suggested itself to the writer: It is a well-known fact, based upon repeated and familiar experience, that section or excision of the various branches of the trifacial, performed by surgeons for the relief of neuralgia, is not followed by any atrophic changes. *It would seem, therefore, that in facial hemiatrophy the disease depends not so much upon a failure of trophic nerve-stimulus as upon a radical perversion of that stimulus.* If it depended upon a simple failure of trophic stimulus, simple arrest of development, simple diminution in the amount of growth, would be the result. Here, however, we have instead an aggressive, an invading process, an actual tearing down and absorption of structure. Evidently, the indication is to interrupt the communication between the trophic centre and its distribution. The expedient, then, which I would propose is resection of the various branches of the trifacial as far as accessible, and the operation to be undertaken at as early a date as the diagnosis is made. The only unpleasant consequence of resection of the trifacial is anæsthesia, and to this, as experience shows, patients soon adapt themselves.

Should the expedient fail and the disease thus prove to be due to some affection of the peripheral nerve-endings, little or no harm would have been done. Everything, however, especially Mendel's discovery, points against a peripheral origin of the atrophy, and if this be the case good would be accomplished. Certainly in the present hopeless aspect of this disease resection of the fifth nerve deserves the most careful consideration.

# NEPHRITIS, PYELITIS, PHOSPHATURIA, CHYLURIA, ALBUMINURIA, LITHURIA, OXALURIA, AND DIABETES INSIPIDUS.

By ANDREW H. SMITH, M. D.

## NEPHRITIS.

### Acute Nephritis.

For the purposes of treatment nephritis may be divided into acute and chronic parenchymatous nephritis and cirrhotic or contracted kidney.

Acute parenchymatous nephritis is characterized by the presence of more or less fever, with usually a slight pain or aching in the region of the kidneys. This pain, however, may be very acute and accompanied by nausea and vomiting. The urine is passed at short intervals, with urgency amounting often to vesical tenesmus, but the total quantity is much reduced. It contains blood, which gives it a color varying from a smoky gray to a dark brown or red. The fever is apt to be accompanied by headache, and frequently there are motes or specks before the eyes. But in many cases these symptoms are absent, and the first intimation of trouble is the occurrence of dropsy. This usually begins in the face or in the extremities, but it spreads rapidly over the whole body. The serous cavities, and especially the peritoneum, are likely to be the seat of effusion at some period of the disease.

On examination the urine is found to be highly albuminous and to contain blood-cells in abundance, and also casts, mostly of the epithelial variety. The specific gravity is below the normal. Chiefly on account of the large quantity of albumin excreted with the urine extreme anæmia is rapidly developed. Owing to deficient elimination of the solid matters of the urine poisoning of the blood takes place, marked by a tendency to convulsions and coma, to which tendency the poverty of the blood also doubtless contributes.

In the treatment of this affection we have two objects in view: the restoration of the kidney, if possible, to a normal condition, and the protection of the system in the meantime from the effects of the impairment of the renal function. The urgency of the symptoms will often

make the latter indication the leading one, and we shall find ourselves compelled to direct all our efforts to rescuing the patient from cerebral or pulmonary conditions immediately threatening life, and to disregard the kidneys for the moment, or possibly even to adopt measures which may seem questionable in regard to the future of those organs.

In very acute and severe cases, marked by considerable pain and fever, with headache and vomiting, and in which the urine is decidedly bloody and is reduced in quantity to perhaps not more than 5 or 10 ounces in the twenty-four hours, there is presumably an active engorgement of the kidney present, and to the relief of this the treatment should be primarily addressed. With this object the circulation should be diverted from the affected organs to the skin and to the mucous surface of the bowels. The patient should be placed in bed and a hot pack or a hot-air bath should be administered. The action of this is to be assisted by the use of diaphoretics in the form of hot drinks, spirit of Mindererus, or, in extreme cases, pilocarpine. Dover's powder, though an old and much-abused remedy, is an efficient stimulant to the skin, and in addition serves to allay the pain. A hot poultice may be applied over the kidneys, preceded perhaps by dry or even wet cups. Cupping, however, should never be so severe as to cause ecchymosis, which defeats in a measure the object in view, since, instead of increasing the capillary circulation, it obstructs it by plugging the vessels with coagulated blood.

At the same time, the bowels should be freely opened by means of a saline purge, and the action continued with smaller doses frequently repeated. If the saline is given in a concentrated solution, its action will be confined almost entirely to the bowels and the kidneys will escape irritation.

A free use of diluents is also important, in order to wash out the retained matters from the kidneys, and by diluting the urine as it forms to render it less irritating to the inflamed structure. It is not always possible, however, to increase the flow of urine by adding to the quantity of fluid ingested, unless at the same time the blood-pressure is increased. The use of digitalis with this purpose in view is, in the opinion of the writer, not entirely defensible. This drug acts as a diuretic only by raising the blood-pressure in the renal capillaries, and it is not difficult to see how this might add to the existing irritation, though much less than would be the case if a stimulating diuretic were employed.

And here it would be as well to discuss, once for all, the principles involved in the use of diuretics in renal disease. So much depending upon the action of the kidneys, it is very important to decide how far we may legitimately stimulate their function under conditions of structural change. This involves necessarily a consideration of the different

ways in which diuretics act. These are chiefly three: by direct stimulation of the parenchyma of the organ, by increase in the amount of water in the blood, and by raising the general vascular tension.

The first of these implies an active determination of blood to the kidney and an increased formation of cells. In a condition of pathological hyperæmia, if not of actual inflammation, such stimulation cannot fail to add to the mischief already present. Indeed, when we consider that the excessive use of certain medicines which act as stimulants to the kidneys may bring about an acute nephritis, we can easily see that drugs of this kind are out of place when a state of engorgement is present. This entire class, therefore, including squill, scoparius, copaiba, cubebs, etc., should be avoided so long as symptoms of congestion are present.

It is questionable also whether the saline diuretics are admissible during this stage. They are eliminated with the urine, and in health appear to increase the afflux of blood to the kidneys, since they augment the excretion of both solid and fluid material. While, therefore, active changes are going on in the kidneys, it can scarcely be otherwise than that the passage of these substances through them should aggravate rather than relieve the abnormal condition.

Increasing the amount of water in the blood will not only increase the bulk of the urine, but will also add, in less proportion, to the solids excreted. This is accomplished without irritation, the process probably being one of simple transudation without action of the epithelium. Its effect is soothing, as it dilutes the urine and washes away irritating material, which would otherwise linger in the half-occluded tubules. A free use of water is therefore of the greatest importance, and it should be given in quantities as large as the patient can comfortably bear. It is found in practice that those so-called mineral waters are most useful which contain the least foreign material, such as the Gettysburg, Clysmic, and Poland waters, and probably simple distilled water is more suitable than any other. If the urine is very acid, however, it is rendered more bland by the addition of an alkali to the diluent.

Increasing the blood-pressure by the action of a class of medicines of which digitalis is the type naturally leads to a freer transudation of fluid from the renal vessels. By adding to the *vis a tergo* it also tends to force along the sluggish current in the congested capillaries, and thus to place the kidney in a better condition to perform its function. This action, it will be seen, is quite different from that of the stimulating diuretics, which produce an afflux of blood by causing local irritation. At the same time, it is the view of the writer that digitalis is not to be recommended in the condition of extreme engorgement of the kidneys, in which the indication is to lower rather than increase the vascular tension. Under such conditions the nitrites may be very useful.

When by reason of extreme irritation the arterioles of the kidney have lost the power of regulating their own calibre, and have become passive tubes, the maintenance of the normal tension in the general arterial system must force more blood into the renal vessels, whose paralyzed walls are unable to resist distension. Nitroglycerin or sodium nitrite by lessening the general pressure relieves the strain upon the weakened vessels and gives them the opportunity to recover their tone. Digitalis finds its most useful application when the symptoms are less active, and when with lessened secretion there are dropsy and feeble action of the heart. Under such conditions it not only acts without causing irritation, but, as a rule, it is more successful than any other diuretic.

While we have active congestion or inflammation going on in the kidneys, as indicated by the presence of fever, pain in the loins, and scanty and perhaps bloody urine, the use of diuretics should be confined to simple or slightly alkaline diluents. Later, medicines that increase the blood-pressure may be employed. Digitalis has been already alluded to. It may be given in the form of the fluid extract, of which the dose is 1, 2, or 3 minims every two or three hours, according to the urgency of the case or the readiness with which the patient responds to the drug; which latter will be found to be an extremely variable factor. By many practitioners the tincture is preferred to the fluid extract, in the belief that the active principles of the drug are more completely soluble in alcohol than in any other menstruum. The dose is from 10 to 30 minims. The official infusion, in doses of 1 to 3 tea-spoonfuls, is perhaps the most efficient form in which the drug can be administered, but it is at the same time the most trying to the stomach. Indeed, digitalis in any form is very apt to nauseate, and in those cases in which the stomach is already irritable from the toxæmia present we are often practically deprived of the use of the remedy for this reason. Digitalin may be retained when other preparations are rejected, and, if not, it can be given subcutaneously, when, even if it increase the vomiting, it cannot thereby avoid the opportunity to do its work. In the hands of the writer, however, it has seldom fully represented the action of digitalis. The dose of digitalin by the mouth is from $\frac{1}{50}$ to $\frac{1}{30}$ grain; when injected beneath the skin, about one-third less.

Caffeine, like digitalis, increases arterial tension and augments the quantity of the urine. It may be employed instead of digitalis or in alternation with that drug. It is most frequently given in the form of the citrate, of which 2 or 3 grains may be taken every two hours. The double salts of caffeine are recommended on account of their extreme solubility and non-irritating character, either when taken by the mouth or hypodermically. The natro-benzoate of caffeine is especially

praised for these qualities, being soluble in two parts of boiling water, and remaining in solution after cooling, while its use by hypodermic injection causes little or no local irritation.

Strophanthus has been somewhat employed in the place of digitalis, and by some is thought preferable to the latter. Its effect upon the blood-pressure is supposed to be more through its tonic action upon the heart than through its influence upon the vaso-motor system. It is not so liable to offend the stomach as digitalis, but, on the other hand, it sometimes provokes diarrhœa. It is usually given in the form of the tincture, the dose of which is from 3 to 5 minims.

The new remedy, diuretin, is claimed to possess very remarkable powers, and, if present indications can be relied upon, seems likely to be of great value in the treatment of the class of cases under consideration. It is a combination of theobromine with sodium salicylate, and is chemically sodio-theobromine salicylate. It is readily soluble in hot water, and is best administered in this way or in the form of a pill. It is given in the quantity of 60 to 120 grains in the twenty-four hours. Babcock of Chicago[1] has employed this remedy with remarkable success both in cardiac and renal dropsy. In one case, in which there was both heart and kidney disease with dropsy, all ordinary diuretic measures had completely failed when the new remedy was resorted to: 90 grains were taken the first twenty-four hours, and subsequently 120 grains a day for four days. The result was astonishing. From a pint and a half during the twenty-four hours immediately preceding, the urine increased to twelve pints the next twenty-four hours, and, under 120 grains of diuretin, to fourteen pints the second day and eight pints the third day. Three days later all traces of ascites had disappeared, all dyspnœa had vanished, and the cough was no longer troublesome. In another case, one of chronic parenchymatous nephritis, in which there was general anasarca, under the use of diuretin the quantity of urine rose at once to one hundred and forty-six ounces in twenty-four hours, with speedy relief of the dropsy, and the diuresis was still maintained, as two days after the medicine was suspended the quantity of urine was one hundred and sixty-one ounces.

Babcock sums up his conclusions in regard to the remedy as follows: "1. Diuretin (Knoll) is a diuretic of great power and promptitude, suitable to all forms of dropsy. 2. Not increasing arterial tension, it is likely to succeed where digitalis, caffeine, and their congeners fail. 3. In cases of cardiac dropsy, with great feebleness of pulse and arythmia, it will strengthen and regulate, rather than depress, the heart's action. 4. It appears to cause no irritation of the stomach or kidneys. 5. It requires to be given to the extent of from 90 to 120 grains daily, and preferably in small doses frequently repeated. 6. It is best given

[1] *N. Y. Med. Journ.*, July 11, 1891.

either in solution in warm water or in gelatin-coated pills, since, if exposed to the air in powders, it undergoes change, with precipitation of much of the insoluble theobromine."

It is difficult, however, to see how so powerful a stimulant to the renal epithelium can fail to irritate the kidneys, but in extreme cases we are glad to avert the present danger even at the risk of ultimate damage to an already crippled organ.

But in by far the greater number of cases of acute nephritis the initial symptoms are less severe than those already sketched, a puffiness about the eyelids or the feet being the first thing to attract attention, and the patient feeling no greater inconvenience than a little nausea or a dull headache. The urine contains an abundance of albumin, is a little smoky, and under the microscope shows a few red corpuscles. The quantity is reduced to from ten to twenty ounces per diem, without a proportionate increase in the specific gravity. The rise of temperature is but slight.

Here we have quite a different picture from that already presented, and we can permit ourselves a little more latitude in our therapeutic measures. We need not hesitate to employ digitalis or other medicines belonging to that group, nor is there danger in a reasonable use of the saline diuretics. Our object is to increase the elimination of both the solid and the fluid constituents of the urine, the former to guard against uræmic accidents, and the latter to prevent an increase of the dropsy and to get rid of the fluid already effused. A combination of digitalis with an organic salt of potassium will ordinarily effect this purpose satisfactorily. The following prescription may serve as an example:

℞. Potassii citratis, ℥ss;
Infus. digital., f ℥ij.—M.
Sig. Two tea-spoonfuls in aërated water every three hours.

The citrate, acetate, and bitartrate of potassium are the salts most frequently prescribed. The latter can be administered very conveniently in the form of cream-of-tartar whey, which is made as follows: To 1 pint of boiling milk add 2 tea-spoonfuls of cream of tartar; strain and sweeten to the taste. This forms a pleasant and nutritious drink, of which half a tumblerful may be taken every two or three hours.

If the kidneys do not respond satisfactorily to these means, the infusion of scoparius may be used as the vehicle. This addition sometimes produces the most happy effect. The more stimulating diuretics, such as spirit of nitrous ether, squills, tincture of the chloride of iron, etc., should not be resorted to until the milder remedies already indicated have been tried.

The iodide of potassium as a diuretic in these cases has not received the attention which, in the opinion of the writer, it deserves. Analogous to the chloride of sodium, the bromides, and other haloid salts in its unirritating quality, it can be taken in large quantity and for long periods when the kidneys are in health without producing the slightest renal irritation; and there is every reason to believe, *a priori*, that relatively it would be as well borne when the kidneys were inflamed. A limited clinical experience seems to the writer to confirm this belief. As a diuretic it is, at least for a while, very efficient. It may be given in combination with the syrup of the iodide of iron, which is often desirable in view of the extreme tendency to anæmia.

Recently fuchsin has come quite prominently into notice in the treatment of Bright's disease. Tyson[1] quotes Cortezao as having obtained remarkable results with it in three cases of œdema with marked albuminuria. He gave it in doses of about 3 grains, interval not stated. Both œdema and albuminuria speedily disappeared. Its good effect was most striking when it was used in connection with milk diet.

The use of calomel as a diuretic has recently been revived, and has met with much favor from prominent clinicians. Some eminent authorities advise its employment in nephritis when the elimination by the kidneys is insufficient, apparently not recognizing the fact that it acts as a diuretic only when it is eliminated through this channel, and that in nephritis the kidneys are disqualified in a great degree for performing their excretory function. As pointed out by Dujardin-Beaumetz, mercurials are eliminated very slowly when the activity of the kidneys is unimpaired. How much longer must they be retained, then, when the function of the kidneys is so nearly suspended! Under these conditions not only do they fail to produce the desired result, but, the mercury being retained in the circulation, there is extreme danger of ptyalism. The reality of this danger is abundantly demonstrated in practice. It is a common observation in hospitals that a mercurial cathartic administered as a routine practice is very likely to cause a sore mouth when given to a patient with nephritis. Even very minute doses, if continued, will produce this result. At one time it was quite a common practice in the treatment of nephritis to administer calomel in doses of $\frac{1}{10}$ to $\frac{1}{6}$ grain, repeated at intervals of two to four hours. Of 56 patients treated in this way at the Presbyterian Hospital, New York, the calomel being continued for from two to six days, no less than 8 were ptyalized. Other diuretics were so commonly employed along with the calomel that the effect of the latter was somewhat difficult to appreciate, but in the few cases in which it was given alone the practical result was not such as to warrant the risk incurred.[2] The experience

[1] *Annual of the Universal Medical Sciences*, 1889.

[2] *Deutsche medicin. Wochenschrift*, Sept. 4, 1890.

of the writer has led to the conclusion that while calomel is a most valuable diuretic in cardiac dropsy without renal complication, its use is contraindicated when the kidneys are seriously involved.

Mercurial stomatitis occurring in a patient having decidedly impaired kidneys is likely to be peculiarly severe in grade and tedious in duration, and the result may be extremely serious or even fatal. The risk of ptyalism is lessened by giving potassium chlorate with the mercurial. Aside from the danger of stomatitis, some authorities, including Lepine,[1] reject the latter drug, in the belief that it is irritating to the kidneys.

Lactose, or milk-sugar, is strongly recommended by Germain Sée as a diuretic.[2] He gives it in quantities of 3 ounces a day dissolved in 2 quarts of water. It acts best in cardiac dropsy, but does well in nephritis if the quantity of albumin is small. It may be remarked, however, that the ingestion of two quarts of water in addition to the usual supply should, of itself, add very materially to the quantity of the urine.

If under the treatment described above the patient progresses favorably, if the urine increases in quantity, if the dropsy disappears, if there are no nervous manifestations, such as headache, somnolence or insomnia, muscular twitchings, disturbance of vision, or persistent nausea, we may rest satisfied, though there may still be a large percentage of albumin in the urine. But if any of these evidences of insufficient elimination persist notwithstanding the use of the measures already recommended, we must call in the aid of the other emunctories, the skin and the bowels. The latter of these is the more efficient. The object in view will be to produce large watery evacuations if dropsy is the leading feature, or to stimulate glandular activity if the symptoms of uræmia are the more prominent. For the former purpose the saline cathartics, such as magnesium sulphate, Rochelle salt, and potassium bitartrate, are to be preferred. The latter, when combined with jalap in the form of the compound jalap powder of the Pharmacopœia, is a very active preparation. In extreme cases the drastic cathartics, such as croton oil, gamboge, scammony, or elaterium, may be required.

While these measures are being employed the supply of fluids should be curtailed, nothing but milk being allowed. This diet is especially appropriate, as it supplies the albumin which is being drained off both by the kidneys and the bowels.

If the symptoms of uræmia afford the leading indication for treatment, the effort should be to increase glandular activity, in order that

[1] Lepine, *La Semaine Médicale*, June 26, 1889; Jendrassik, *Wien. med. Presse*, July 28, 1889; Bicganski, *Br. Med. Journ.*, June 22, 1889; Shirtzig, *Pacific Med. Journ.*, 1889; Erb, *Times and Register*, Sept. 28, 1889.

[2] *Year-Book of Treatment*, 1890.

the solid excrementitious material which the kidneys are unable to eliminate may be carried off through other channels. While we cannot consider the bile as an excretion, there can be no doubt that a condition of hepatic activity carries with it more active elimination by the intestinal glands; which is perhaps due to the cathartic action of the bile itself. Such medicines, therefore, as stimulate the liver are especially adapted to the purpose we have in view, with the single exception, however, of mercurials, to which, as we have seen, there are decided objections.

In urgent cases we are obliged here, as in the case of dropsical effusions, to call in the aid of the powerful drastics, which in the very abundance of the discharges they occasion ensure a draining away of the offending material. Croton oil in 1- or 2-drop doses, or $\frac{1}{4}$ to 1 grain of elaterium, according to the activity of the particular preparation, may be employed. Harley[1] suggests that, to avoid the danger of long-continued diarrhœa following the use of the latter drug, it should always be combined with hyoscyamus. Under the influence of this treatment we shall occasionally be so fortunate as to see a comatose patient recover consciousness, or one suffering from convulsions rescued from the most imminent peril. A tendency to drowsiness or persistent headache, or the occurrence of slight muscular twitchings, should be the signal for active interference with the view of anticipating an uræmic explosion.

A less efficient, but at the same time a very valuable, supplementary resource lies in exciting diaphoresis. This is more available as a means for combating uræmia than for getting rid of dropsical effusions, the perspiration containing a relatively large proportion of effete material. The hot-air bath is the most convenient method of exciting the action of the skin. It can be extemporized with the greatest ease. All that is required is an alcohol lamp, over which is placed a tin funnel provided with a tube bent at a right angle and of a convenient length to pass under the bed-clothes at the foot of the bed. The bed-clothes should be tucked closely about the patient's neck. The heat generated by the lamp, together with the steam formed by the combustion of the alcohol, is generally sufficient to cause profuse perspiration. Sometimes, however, the skin becomes hot and dry instead of perspiring. In these cases hot stimulating drinks will start the diaphoresis, which will then continue under the influence of the heat. In obstinate cases small doses of jaborandi or pilocarpine may be required for this purpose. The bath may be continued for an hour or more, and repeated two or three times daily, due regard being had to the depressing effect upon the heart, and stimulants being used if required. The patient should never be left alone for more than a few minutes during the bath,

[1] *The Urine and its Derangements.*

as cardiac weakness is liable to occur suddenly. In such a case the lamp should be removed at once, and the hypodermic use of digitalis and brandy should be resorted to. Cold sponging to the chest will also be of service.

With regard to the use of pilocarpine in full doses, it may be said that while its action is very prompt and vigorous, it is at the same time more exhausting than other diaphoretic measures, and that in cases sufficiently urgent to demand its use the patient is generally too much reduced to bear it with safety. It is an heroic remedy of which it cannot be said that if it does no good it will do no harm, for if it does not cure, it is quite competent to kill.[1] If in a desperate case we decide upon its use, it must be with the consent of the patient's friends, based upon a full understanding of the danger. The dose for hypodermic use is $\frac{1}{8}$ to $\frac{1}{4}$ grain.[2] This view, however, is not universal. Marshall[3] thinks that the value of jaborandi and its alkaloid in the dropsy of Bright's disease cannot be overestimated. By their use he has relieved in many cases some of the most distressing features of this complication, and prolonged life or rendered its termination less painful. He reports a case of parenchymatous nephritis, dropsical to bursting from head to foot, in which as a last resort he tried hypodermic injections of pilocarpine, and the patient grew steadily better until he could do his regular work, œdema and albuminuria having almost entirely disappeared. He found it best to precede the injections with gin to prevent faintness.

The diet in acute nephritis should be exclusively of milk, at least during the first few weeks. The milk furnishes, as a rule, sufficient albumin to replace the loss through the kidneys, and it supplies all the other elements necessary for complete nutrition, with a modicum of waste material. It is also a diuretic of considerable power, and which does not irritate the kidneys.

Patients will often complain that they do not like milk, that it has never agreed with them, that it makes them "bilious." All this may be true, and yet with a little patience the difficulty will be overcome. If the casein is not well digested the remedy lies in peptonizing. If in this process the milk acquires a bitter taste, this may be covered by the addition of a little coffee. To vary the monotony, buttermilk may be occasionally substituted. Koumyss and matzoon or kefir will often be acceptable when milk in other forms disagrees or is distasteful.

It is always better that milk be taken with a spoon, as this ensures an adequate mixture with the fluids of the mouth, without which diges-

[1] Henoch, *Dis. of Children*, vol. ii., 1889.

[2] Egan, N. Y. *Med. Record*, vol. xxxvi; Schreiber, *Berlin. kl. Wochenschrift*, June 1, 1889.

[3] *Lancet*, 1888.

tion is likely to be imperfect. Half a pint of milk may be taken in this way without any sense of oppression following, whereas if swallowed rapidly from a glass there would be a feeling afterward as of a load in the stomach, followed by eructations of gas. Diluting the milk with an equal quantity of water is often a useful measure.

In some cases there is such constant nausea that sufficient nourishment cannot be taken by the stomach. This may be overcome to some degree by sucking bits of ice, by the use of bismuth or hydrocyanic acid, or by sinapisms applied to the epigastrium. But it should not be forgotten that this is one of Nature's methods of elimination, and that if the vomiting is arrested without some other discharge to take its place, a deepening of the uræmic condition may be the consequence.

If it is found impracticable to depend wholly upon the stomach, and especially if it is observed that vomiting takes place only after taking food, it is well for a while to resort to nutritive enemata. These should consist of thoroughly peptonized milk. If there is difficulty in retaining them, a little tincture of opium may be added, which, so far from being objectionable, will rather tend at the same time to allay cerebral irritation.

During the febrile stage the patient should be kept constantly in bed, and during the persistence of albumin in the urine should be allowed to go out of the house only when the air is dry and warm. Flannel should be worn next the skin even when in bed. Muscular exertion is to be avoided, as increasing tissue-waste and the necessity for eliminative action.

Œdema of the lungs is a not infrequent complication of nephritis, and is due partly to the thinness of the blood and partly to weakness of the right heart. In most cases it comes on gradually, and it is liable to be overlooked for a time if the chest is not frequently examined. The condition requires counter-irritation, dry cups, and the administration of nitro-glycerin or sodium nitrite. Caffeine, strophanthus, nux vomica, and ammonia may prove of service. Digitalis should be used cautiously if at all. Inhalations of oxygen may tide over an emergency.

## Chronic Parenchymatous Nephritis.

This may be the sequel of the acute form, or the disease may be chronic from the first; that is to say, not preceded by any of the symptoms which mark the onset of an acute attack.

Œdema is usually the first indication, or if other symptoms have occurred they have been so slight as to escape notice. The objective phenomena are essentially the same as in acute nephritis, but they are less serious. The urine is habitually scanty and contains albumin in abundance, together with tube-casts of different varieties. The patient becomes very anæmic and the strength fails as the case progresses.

The same principles that govern the treatment of the acute form apply here, modified only by the slower progress of the disease. The measures employed in the acute will be called for intermittently in the chronic affection, for the course of the disease will present many variations, and conditions will arise from time to time identical with those presented by the acute form.[1]

The questions of most importance growing out of the protraction of the disease are those of diet and climate.

Milk, while still forming the chief dependence, cannot be employed alone for an indefinite period. It is necessary, therefore, to study the effects of different kinds of food upon the morbid process going on, not only in the kidneys, but elsewhere as well. The problem is: Given renal vulnerability and renal inadequacy on the one hand, and loss of albumin and general malnutrition on the other, how are we to strike the balance so as to keep up the nutrition without irritating or overloading the kidneys?

Now, in considering this problem it is all-important that we should have a correct standard for estimating the condition of the patient, so that we may know whether any particular regimen is benefiting him or the reverse. The standard generally accepted is the amount of albumin excreted by the kidneys. But this is not wholly correct, for fluctuation in the quantity of albumin is much oftener the result of changes in the diet than of changes in the disease.

It is impossible to escape the conviction that many authorities in employing this standard unconsciously assume an analogy between albuminuria and glycosuria, although in one case the abnormal element in the urine is drawn from an abnormal element in the blood, while in the other it is drawn from a normal and necessary one. In glycosuria it is the presence of sugar in the blood that constitutes the danger; in albuminuria it is the loss of albumin from the blood that exhausts the vitality.

The only ground upon which the amount of albumin lost could be taken as the index of the gravity of the disease would be that albumin escaped from the kidneys only in proportion as their condition was abnormal, and that no other factor than this abnormality entered into the case. And yet we know that changes of diet alone often produce

[1] Stewart gives the indications for treatment as follows: "1. Removal of cause or causes, or of some individual cause which still remains in operation. 2. Curing, if possible, the morbid action which has occurred or is still going on in the kidney, or at least the limitation of the action to the part which has been primarily involved. 3. The removal or modification of the various results, whether of the nature of symptoms or complications, which follow upon the renal lesion, as, for example, the drain of albumin, the gastro-intestinal symptoms, the dropsy, the uræmic symptoms, the serous inflammations, and the vascular and cardiac changes consequent upon the process."

an increase or diminution of the percentage of albumin in the urine. If, then, we institute these changes with the purpose of affecting the output of albumin, what becomes of the staff with which we were to measure the disease?

The only true standard is to be found in the general condition of the patient. If on changing from a non-nitrogenous diet to a nitrogenous one we find a general improvement in the patient's condition, it is an evidence that the change was beneficial, no matter if the albumin fills a larger portion of the test-tube. On the other hand, if we cut off a large proportion of animal food from the diet, and our patient grows more dyspeptic, weaker, more anæmic, and more dropsical, it is nothing to the point that only one-half or one-third of the former quantity of albumin is found in the urine; the change has done harm, and the sooner we change back again the better.

We should, above all things, seek that diet for the patient which he can best digest and assimilate, for we may rest assured that the products of faulty digestion and assimilation will irritate the kidneys more than any amount of normal material they may be called upon to eliminate, while at the same time the general system will suffer from lack of support.

Nevertheless, certain general principles in regard to diet may be formulated, subject to variations in any particular case.[1] According to Senator, we should avoid albuminoid articles of diet, the food being chiefly fat and carbohydrates. Give the patient plenty of nourishment, but of such a character as to free the kidneys from as much albumin as possible. The proportion of the albuminoids to the carbohydrates should not be more than 1 to 4. Fifty grammes of albumin, 2 litres of cow's milk, or from 8 to 10 eggs or 250 grammes of meat is the lowest quantity required by the organism, and need not be exceeded if food free from nitrogen is taken in sufficient quantity. Important in relation to causation, the morbid process itself, and to its results, a highly albuminous diet must favor the occurrence of albuminuria when the kidneys are diseased, and make the renal lesion more severe and persistent.

[1] Persons who are weak and ill-nourished from any cause are apt to receive animal broths, beef-tea, bouillon, etc., with a view to "building them up." These articles have, in reality, very little food-value, and therefore fulfil very imperfectly the duty assigned to them. At the same time, they are open to a serious objection, in that the process of preparation assures the extraction of all the possible toxines contained in the meat, whatever else it may leave behind. These substances (ptomaïnes, leucomaïnes) are in a condition to be absorbed directly into the blood and to find their way at once to the kidneys. Whatever may or may not have been their influence in causing the disease originally, they can scarcely fail to irritate the kidneys after the affection is declared. Add to this the probability that these toxines play an important part in producing the phenomena of uræmia, and we have abundant reasons for leaving out this class of preparations from the dietary of nephritis (Gaucher, in *Annual of the Universal Med. Sci.*, 1889).

Stewart gives as the essentials of a good diet that it be—1. Nutritious; 2. Easily assimilated; 3. Non-irritating to the kidneys. Milk meets the indications better than any other one article of diet, and is in addition diuretic, which is of great value when there is blocking of the tubes or when dropsy is present. An exclusively milk diet is disadvantageous, in that not all patients like it. It is apt to produce catarrh of the stomach, constipation, and hepatic disturbance. Avoid these by giving not more than 4 to 7 pints in twenty-four hours, and in small quantities at a time. Dilute well with hot, cold, or aërated waters. Dilute with lime-water if bowels are loose, or with fluid magnesia if constipation exists. If the liver is disordered use skimmed milk or buttermilk. If milk proves indigestible, peptonize it. But in Stewart's hands a diet chiefly of milk, with an addition of a little pudding, fruit, and white meat, has given the best results. Alcohol he regards as amongst the most important of causative agents, and also most irritating to the kidneys when once an inflammation has been lighted up. If alcohol must be given in any case, it should be well diluted—light wines in preference to the heavy and sweet. Malt liquors are to be entirely denied to the patient.

According to Stewart, cases of Bright's disease losing from 30 to 40 grains of albumin in twenty-four hours are in no danger from the loss; but when, as in many cases, 300 to 400 grains of albumin are passed daily in the urine, the condition is alarming, for here the patient is losing from one-fourth to one-fifth of his total albuminous food, or, as may be shown by a little calculation, he is daily passing by his urine the equivalent of one-twelfth part of his blood. The seriousness of such a drain is evident.

How shall this drain be met? 1. By giving albuminous food, and especially milk. A pint of milk Stewart estimates as furnishing about an ounce of albumin and casein, and an extra pint should be given if the patient can digest it. 2. By giving medicine. Tincture of chloride of iron and the hydrochlorate of rosaniline have in some cases proved valuable, apparently diminishing the amount of albumin excreted, without influencing the amount of urine or urea. For the deterioration of the blood present in many cases Steward has used arsenic and iron. The constipation and hepatic disturbance of the latter he corrects by the addition of glycerin or ammonium chloride. Tannic acid, tannate of sodium, ergot, and potassium iodide have failed in his hands.

Climate is of great importance in these cases. In general terms, a warm, equable climate, with an elevation not much above the sea-level, is to be preferred. It is not required, however, that the patient should remain constantly in one place, or necessarily be permanently exiled from home. He can change his locality with the change of the seasons. In summer a northern climate is not objectionable, but when practi-

cable the patient should move toward the south as the autumn advances.

The clothing should be sufficient at all times to protect against a chill from draughts or sudden changes of temperature. Woollen under-clothing is necessary at all seasons of the year, and it is well to have the kidneys specially protected by a woollen band around the body.

The frequent use of warm baths, followed by shampooing, is of much service in keeping the skin active. Dry friction morning and evening with a flesh-brush or a rough towel fortifies the skin to a remarkable degree against impressions of cold.

Tissue-waste should be avoided, as the waste material is gotten rid of with difficulty and tissue-rebuilding is defective. Hence muscular exertion should be reduced to the minimum consistent with health. This, however, does not preclude carriage exercise, which should be indulged in freely when the strength of the patient and the atmospheric conditions will permit. But the slightest aggravation of the symptoms calls for complete rest in bed until the former condition is restored. Indeed, the value of such rest cannot be too much emphasized. It is often sufficient in itself to arrest for the time being the visible progress of the disease.

In the management of uræmic manifestations other measures in addition to those already indicated may be required. The hypodermic use of morphine in convulsive seizures is strongly recommended by Loomis, and his suggestion has met with very general acceptance. Stephen Mackenzie especially strongly supports his view. Carter[1] gives as the indication for the use of morphine uræmia *with dilated pupil.* Chloral is employed for the same purpose, and often with marked success. The bromides, given in full doses during the premonitory stage, will often avert eclampsia, but their action is so tardy that they are of little or no value after the attack has begun. Oxygen inhalations are highly praised by Lanceraux, Dujardin-Beaumetz, and others as tending to destroy the toxines in the blood. Some cases in the experience of the writer confirm these views.

When the pulse is very full and tense, a condition of rather rare occurrence, venesection may afford the happiest results. In a case under the care of the writer coma developed rapidly in a vigorous man about forty years of age who had previously complained only of severe headache, and presented no objective phenomena other than a very large amount of albumin in the urine. The pulse was large and hard. Bloodletting to the extent of twenty ounces was followed within an hour by gradually returning consciousness, and eventually by complete recovery.

[1] *Internat. Med. Annual,* 1890.

Nitro-glycerin is indicated under the same conditions, and will often answer the purpose nearly as well. Cold to the head will sometimes be of service when pyrexia is present, also leeches to the back of the neck near the foramen magnum.

Finally, in the collapse which often accompanies uræmic attacks alcoholic stimulants and the application of heat externally will be required. Henoch[1] recommends the subcutaneous injection of camphor.

The dropsical condition may call for local treatment. If fluid accumulates in the serous cavities in such quantity as to cause distress by pressure upon neighboring organs, it should be removed by paracentesis. This is especially true of intrapleural effusion. Blistering, often successful in chronic pleurisy, would be useless here. The operation should not be delayed after the breathing has become notably embarrassed, as deficient respiration, besides the distress it occasions, operates unfavorably upon the general condition.

Hydroperitoneum, if the tension is considerable, interferes with the action of the kidneys by the pressure of the fluid upon them. This pressure also acts as an obstacle to absorption by mechanically occluding the absorbent vessels. Relieving the pressure by the use of the trocar will often be followed by greatly-increased action of the kidneys, and even when only a portion of the fluid is removed by the operation the remainder will rapidly disappear.

The enormous anasarca which often renders the patient entirely helpless, and by reason of his vast bulk and weight makes the task of his attendants extremely difficult, may require local measures for its reduction. Simple punctures with a common needle will drain away a large amount of fluid. The skin should be washed with an antiseptic solution before the punctures are made, and antiseptic precautions should be observed throughout. Neglect of these is liable to result in erysipelas. A round needle is to be preferred to one with cutting edges, as it is better to separate the tissues of the skin than to incise them. Southey has introduced capillary tubes through the skin, and his plan is endorsed by Ziemssen and others, but it has not met with general favor.

When the œdema is limited to the extremities careful bandaging is of great service.

Both Senator and Johnson have seen the symptoms of parenchymatous nephritis come to a standstill and disappear entirely after continuing for two or three years. Of course organic changes remained.

### Chronic Interstitial Nephritis.

Contracted or cirrhotic kidney is a chronic affection characterized anatomically by an increase in the fibrous element of the organ, with

[1] *Lectures on Dis. of Children*, vol. ii., 1889.

contraction and hardening, and clinically by increased frequency of micturition, increased quantity and diminished specific gravity of the urine, slight and intermittent albuminuria, and ultimately uræmic manifestations. The disease is commonly associated with cardiac hypertrophy and arterio-capillary fibrosis. Its duration may extend over many years, and often the fact that it has existed is discovered only at the autopsy. Interstitial nephritis is intimately associated with the gouty diathesis, and is generally found in persons whose heredity or whose mode of life tends in that direction. Alcohol indulged in, either by the patient himself or by his progenitors, unquestionably is responsible for a large proportion of cases. Metallic poisons, such as lead and copper, are occasional causes. Syphilis is not infrequently a factor, but it is more likely to cause waxy kidney.

The clinical picture of this disease differs from that of chronic parenchymatous nephritis chiefly in its being slower in progress, attended by much less dropsy, affording very little albumin in the urine, and in its usually first declaring itself by evidences of uræmia. It is also more frequently attended by cardiac changes.

Very often the only measure of the seriousness of the disease is to be found in the quantity and specific gravity of the urine.[1] The increase in the one does not compensate for the decrease in the other, and the elimination of solid matter is deficient.

The treatment aims at removing the cause if this is possible, and warding off the uræmic attacks.

The use of alcohol should be absolutely interdicted, or, if this is not possible, it should be reduced to a minimum amount. In no case should malt liquors be allowed. The diet should be regulated on the principles already laid down for parenchymatous nephritis, except that starch and sugar should be used sparingly, the green vegetables and fats supplying their places.

It is to be borne in mind that the kidney is invaded irregularly, and that while portions of it are rendered useless, other parts remain capable of continuing their function. Hence, although the disease always proves fatal in the end if not anticipated by some other affection, life may be prolonged for many years under favorable conditions.

Attacks of parenchymatous inflammation are liable to occur in those portions of the kidney not previously invaded by cirrhosis. With the occurrence of these attacks there will be dropsy and a temporary increase of albumin in the urine. As these attacks are apt to be excited by cold, it is especially necessary to guard against exposure. For this

[1] A rough-and-ready rule which the writer has found useful in examining the urine is, that the product obtained by multiplying the last two figures of the specific gravity by the number of ounces per day should fall between 600 and 900. If less than 600, it suggests renal disease; if more than 900, diabetes.

reason an annual change to a milder climate should be adhered to when practicable.

As to the use of drugs, those cases which are associated with the lithic-acid diathesis are benefited by the alkaline mineral waters, and especially those containing lithia.

Iodide of potassium is supposed to have an influence in preventing the formation of new connective tissue, and for this reason is recommended by some authorities. Senator has seen benefit from its use. Small doses of mercury, usually in the form of the bichloride, are given by many practitioners with the same object in view, but the course of the disease is so erratic that it is difficult to decide as to the amount of benefit derived. Of course when there is a history of antecedent syphilis both these remedies are indicated, but we are not to expect from them as satisfactory results as are obtained in many other chronic affections in syphilitic subjects. Lead-poisoning is of course to be met by removing the patient from the toxic influence. The elimination of lead is probably best effected by potassium iodide. Sulphur waters and sulphur baths are useful to some extent by fixing the lead as an insoluble and innocuous sulphide.

In the uræmic condition, unaccompanied, as it usually is, by dropsy, Sahli employs "internal lavage," which is simply the hypodermic injection of a large quantity of a weak solution of chloride of sodium. About a litre is introduced at each operation, and this is repeated twice or three times a day. Profuse diuresis results.[1]

One of the greatest dangers to which the patient with contracted kidneys is exposed is cerebral hæmorrhage. This results from the tension of the vessels growing out of the cardiac hypertrophy and the general arterio-capillary fibrosis. So far as this condition of the vascular system is influenced by drugs, potassium iodide and mercuric chloride are the most likely to be serviceable in limiting the formation of fibrous tissue. But relaxants of the vaso-motor system are more immediately effective in lessening the danger. Their influence can very readily be estimated by observing the change in the second sound of the heart which follows the administration of, for example, nitro-glycerin. From being remarkably sharp and ringing, it loses its accentuation and becomes more nearly normal in its character. The pulse at the same time becomes larger and less tense. The effect upon the circulation is similar to that of venesection.[2]

Medicines of this class are therefore indicated whenever the arterial

[1] *Dietetic Gazette*, July, 1891.

[2] Nitro-glycerin may be given in doses of $\frac{1}{100}$ to $\frac{1}{50}$ grain. As the effect of this drug is expended in less than an hour, the dose requires frequent repetition. For this reason the writer prefers sodium nitrite in doses of 2 to 4 grains, such doses continuing their action for three or four hours.

tension becomes threatening. If they fail to act satisfactorily and the case seems urgent, venesection is warranted.

## Amyloid Kidney.

The waxy kidney found in conjunction with disease of other organs, and dependent upon either syphilis or a focus of chronic suppuration, calls for little in the way of treatment distinct from that appropriate to the diseased condition from which it springs. When a syphilitic history can be made out the treatment for tertiary syphilis is called for, and will in rare instances arrest the degenerative process.

Suppurating foci and caries or necrosis of bone should receive prompt surgical attention as a measure of prophylaxis, since treatment generally proves too late if the evidence of waxy disease is already present.

In the exceptional cases in which dropsy or uræmia develops, the treatment does not differ from that advised for this condition in acute or chronic nephritis.

## Pyelitis.

Inflammation of the membrane lining the pelvis of the kidney may be simple, obstructive, or calculous.

Simple pyelitis may be merely catarrhal, the result of exposure, or a manifestation of the rheumatic diathesis, or it may occur in the course of an infective disease as the result of the local action of the poison. In any of these cases it may be unilateral or bilateral, more frequently the former. It is a disease usually of short duration, and not declaring itself by any more definite symptoms than pain more or less pronounced in the lumbar region, and a certain degree of vesical irritability. The urine is generally, but not invariably, acid. It contains pus and mucus, together with the peculiar epithelium lining the pelvis of the kidney. The presence of the latter is necessary for an absolute diagnosis, as the other matters in the urine may be derived from any portion of the genito-urinary tract. The acidity of the urine goes far to establish the diagnosis as against cystitis, but it cannot be entirely relied upon, as acidity is possible in the latter and is not invariably present in pyelitis.

The obstructive form depends for its origin upon retention of urine in some portion of the urinary tract. The symptoms are masked by those of the retention, and so long as this continues the one class cannot be distinguished from the other. In chronic cases the quantity is increased and the specific gravity is proportionately low.[1] The retention being relieved, the symptoms of pyelitis remain. It frequently happens that the mucus, etc. from the pelvis of the kidney blocks up the ureter and causes a temporary arrest of the flow of urine, during

[1] Ultzmann, *Pyuria.*

which there will be complete absence of the pus and other products of inflammation previously contained in the urine. At the same time there will be lumbar pain, which will become more and more intense until finally the pressure forces the obstructing plug through the ureter, bringing immediate relief. At the next micturition the urine, previously clear, will be loaded with pus. This alternation of clear with purulent urine renders it certain that the disease is unilateral.

The calculous variety is the result of the presence of one or more calculi in the pelvis of the kidney. In addition to the characteristics of the urine already described, it contains a considerable amount of blood at times, and calculi, usually of uric acid, are voided at intervals, the voiding of each calculus being preceded by an attack of renal colic. A calculus may become impacted in the ureter and cause a distension of the pelvis of the kidney to such an extent as to form a tumor of considerable dimensions.

In the treatment of the simple form of pyelitis the indications are to remove the cause, to render the urine bland and unirritating, and to employ certain drugs, which, being excreted with the urine, exert a healing influence upon the inflamed membrane.

The first indication requires, of course, the suspension of the use of cantharides, turpentine, or any other drug which may have caused the local irritation. If the pyelitis is connected with the rheumatic diathesis, remedies addressed to this condition will be appropriate.

The second indication is met by the use of diluents, such as plain water, flaxseed or melon-seed tea, barley-water, etc. In the season of melons the free use of this fruit is of service. If the urine is decidedly acid, much benefit will be derived from the employment of alkalies, especially when given before meals. For this purpose the alkaline mineral waters are convenient, as they not only supply the needed alkali, but act as diluents at the same time. The aim should be to keep the urine as nearly neutral as possible.

In pursuance of the third indication the alterative diuretics are employed. In recent cases which call for a soothing and astringent effect buchu, uva ursi, pareira brava, and chimaphila are to be selected. In more chronic cases, requiring gentle stimulation of the mucous surface, the choice will be from the more active agents of this class, such as juniper, oil of sandal-wood, oil of erigeron, the stigmata of zea mays, etc. Even turpentine, which is capable in large doses of exciting the disease, is often useful in smaller doses when the suppuration is extreme and a decided alterative action is required. It should be given in emulsion in 10- or 15-drop doses. Wood states that by the addition of 1 drachm of glycerin and 1 or 2 drops of oil of wintergreen to each dose the disagreeable taste of the turpentine may be almost entirely disguised.

The medical treatment of calculous nephritis consists in measures

to relieve pain, to soothe the irritated and inflamed membrane, and so to change the reaction of the urine as to remove or lessen the tendency to the formation of calculi.

To accomplish the first of these objects it may be necessary to resort to hypodermic injections of morphine, or even to the use of chloroform. In less severe cases the writer has succeeded in obtaining adequate relief from pain by the use of phenacetin in doses of 7 to 10 grains. Belladonna and hyoscyamus are occasionally useful. Buchu and uva ursi exert a soothing influence upon the affected surface, and enable it to tolerate better the presence of the calculus. The same is true of the sweet spirit of nitre, which often allays to a marked degree the distressing vesical tenesmus. It is claimed by some authorities that the fluid extract of zea mays has a specific anodyne effect upon the urinary mucous membrane.

Renal calculi being generally composed of uric acid, and this acid being kept in solution by an alkaline condition of the urine, the use of alkalies is of great importance. It is not probable that a calculus once formed can be dissolved by their employment, but much can be done in this way to prevent the deposition of fresh material. The alkali may be given uncombined in a weak solution, as when liquor potassæ, much diluted, is employed. But, as a rule, the carbonates or the salts of the alkalies with vegetable acids are to be preferred. The citrates, tartrates, acetates, etc. produce the same effect upon the urine as their bases, and are less harsh and irritating. Caution is necessary, however, not to carry the use of alkalies too far, lest they bring about a deposition of phosphates upon the uric-acid stone already in the kidney. This is to be avoided by testing the reaction very frequently and keeping the urine faintly acid.

It occasionally happens that the calculi formed in the kidney are composed of triple phosphates or of the carbonate of calcium. In a case under the observation of the writer concretions are formed of the organic débris, pus, epithelial cells, etc., cemented together by calcium carbonate and forming calculi of remarkable lightness and friability. In this case, although there is no cystitis, the urine is alkaline; and such is usually the reaction when the gravel is phosphatic. Under such circumstances the effort should be to acidify the urine, with a view to maintaining the phosphates or carbonates in solution. Practically, this is a matter of considerable difficulty. Very few of the acids when taken into the stomach appear in the urine. In fact, according to LeGrand, the only urophanic acid is the carbonic. The mineral acids exert directly very little, if any, effect upon the urinary reaction. Phosphoric acid, probably by increasing the formation of the acid (monobasic) phosphates, will sometimes overcome a slight degree of alkalinity, but this result is not uniformly obtained, and

probably depends in some degree upon varying conditions of metabolism.

Among the organic acids saccharin probably is the most efficient for the purpose of acidifying the urine. It passes unchanged through the kidneys, and not only acts in the urine as an acid, but at the same time exerts a powerful effect as an antiseptic. This double action makes it a most valuable agent whenever the urine is alkaline and offensive, whether the disease be seated in the pelvis of the kidney or in the bladder. The writer is satisfied from ample experience that it can be used continuously for months together without the slightest danger. It may be given in doses of 2 or 3 grains three times a day, and is best administered in capsules.

Next to saccharin, benzoic acid in doses of 10 to 15 grains will be found most successful. It passes into the urine in the form of hippuric acid. On account of its acrid taste it also should be given in capsules.

If cystitis is present at the same time, causing alkaline fermentation in the bladder, it may be difficult to estimate the effect of these measures upon the urine. To do this it may be necessary to wash out the bladder and to test the urine which flows into it immediately afterward.

When suppuration is profuse astringents given by the mouth have some effect in lessening the formation of pus. Of these, tannin, tannate of quinine, and alum are specially recommended by Ultzmann. The alum may be given in the form of alum-whey, of which a pint should be taken daily:

℞. Seri lactis clarif. (whey), Oj;
Pulv. alumin., gr. xlv.—M.
Sig. Take during the day.

℞. Acidi tannici, gr. xv;
Sacchari, gr. xxx.—M.
Ft. in chart. No. vj.
Sig. Take three powders each day.

℞. Quininæ tannat., gr. xv;
Sacchari, gr. xxx.—M.
Ft. in chart. No. vj.
Sig. Give three powders daily.

To neutralize the constipating effect of these astringents an aloetic pill may be given at night.

In all the forms of pyelitis local measures are of some value.

During the acute stage pain may be relieved to some extent by poultices, fomentations, hot-water bags, dry cupping, etc. Immersion in a warm bath will often be of the greatest service, especially in an attack of renal colic. It acts not only by distributing the blood over the whole surface, and thus relieving local congestion, but at the same time it serves to relax the muscular fibres of the ureter and to facilitate the passage of the calculus.

Pyelitis in the female may present marked exacerbations at the catamenial periods. In a case under the observation of the writer these exacerbations closely simulate attacks of renal colic. Here there is probably a thickening of the walls of the pelvis and ureter, which, being increased by the hyperæmia from reflected uterine irritation, causes an obstruction to the flow of urine. In these cases the indication is to moderate the local excitement due to the menstrual nisus. For this purpose the bromides, manganese, hyoscyamus, pulsatilla, etc. will be of service. Hot vaginal douches repeated every three or four hours will produce a favorable revulsive action. Rest in bed as the period approaches is an important prophylactic measure.

In cases of protracted calculous pyelitis the question of surgical interference will come up. The operation of nephrotomy, or perhaps of nephrectomy, may in some cases present the only hope of relieving the patient from a lingering and painful affection under which, without this relief, he must inevitably sink. The decision as to the propriety of such interference will rest upon, first, the general condition of the patient and his ability to bear up further against the exhausting influence of the disease; and second, upon whether the disease is stationary or advancing. The impairment of the function of the kidney involved must not be lost sight of, as it places the patient in great peril in case the other kidney should become diseased. In this view an early nephrotomy, before the kidney has too far lost its functional activity from change of structure, presents many advantages. The comparatively small risk to life under the modern antiseptic methods should decide us not to wait until the only benefit to be expected from operating would be to get rid of a diseased and useless organ, which earlier might have been saved in a fairly serviceable condition. Though the actual operation falls within the domain of surgery, the question of its expediency in a given case must be considered first by the physician, and he should be prepared to advise intelligently in regard to it. According to Ashhurst,[1] nephro-lithotomy should unhesitatingly be done in all cases in which symptoms of calculus continue uninfluenced by medicine and are sufficiently severe to interfere materially with the comfort and usefulness of the patient's life. If for several months a person has been subject to more or less constant

[1] *Internat. Encycl. of Surgery.*

pain in one loin and along the ureter, and perhaps also in the testicle of the same side, if there have been recurring attacks of renal colic, and especially if with these symptoms there has been occasional hæmaturia, or the urine has been constantly charged with a little pus or albumin, we have the condition not only justifying, but demanding, an exploration. If in addition to these symptoms a small calculus or a little calculous matter has been passed *per urethram*, there is almost absolute certainty of a stone.

As regards the danger of the operation, Ransohoff[1] gives the following statistics: Of 72 cases of nephrotomy with drainage, 18.2 per cent. proved fatal; of the 59 survivors, 32.2 per cent. retained persistent fistulæ or sinuses. In this latter case nephrectomy might be considered as indicated. Nephrotomy diminishes the risk of a succeeding nephrectomy by more than 40 per cent. (Gross).

## Phosphaturia.

Phosphaturia may be defined as the secretion during a time of slightly acid, neutral, or alkaline urine, which frequently is whitish and turbid when voided, and which speedily deposits an abundant sediment consisting largely of earthy phosphates. By reason of its neutral or alkaline reaction this urine, if not already turbid, becomes milky on boiling, the carbonic acid which held the phosphates in solution being driven off by the heat. This turbidity disappears immediately upon the addition of an acid, which serves to distinguish it from that which is produced by the coagulation of albumin. But it is possible that an excess of phosphoric acid in the form of acid phosphates may exist in the urine without manifesting its presence in this way. Indeed, in exceptional cases the very excess of the acid present may serve to keep the phosphates in solution; the acidity of the urine, rather than the actual proportion of the phosphates, determining this point. In these cases an idea of the amount can be obtained by a very simple test. A solution of 1 part each of magnesium sulphate, ammonium muriate, and strong liquor ammoniæ to 8 parts of water is added in small quantity to the urine. In the reaction which follows all the phosphoric acid present is precipitated in the form of phosphate of magnesium and ammonium, and its quantity may be readily estimated.

The excess of phosphoric acid in the urine is sometimes associated with a great increase of the bulk of the secretion, constituting what has been called phosphatic diabetes. During the past year the writer has had under his care a case in which the average daily excretion amounted to nearly one hundred ounces. At times the deposit of phosphatic sand would represent one-fourth of the entire bulk.[2]

[1] *Ref. Handbook of Medical Sciences.*

[2] This polyuria not infrequently passes into a condition of true saccharine diabetes.

Phosphaturia may be taken, as a rule, to indicate excessive waste of brain- and nerve-tissue. It is associated with depression of the vital powers, and especially of the nervous system. It is a common accompaniment of nervous exhaustion from overwork, mental anxiety, sexual excess, etc. In meningitis and other affections involving cerebral irritation it is usually present. In febrile diseases it is marked during the period in which the appetite is in abeyance, but diminishes or disappears as the ability to take food returns. If persistent it constitutes a condition of considerable gravity. It is marked by great nervous irritability, mental depression, and loss of strength and energy. Insomnia is a common symptom, and may be a very serious and persistent factor in the case. When present it prevents, *pro tanto*, the brain-rest which is so necessary to the well-being of the patient.

In the management of these cases the causal indication is pre-eminently important. It is useless to give drugs while the conditions which have produced the disease remain unchanged. We must therefore seek for these, and, though sometimes they are not easy to discover, they often lie immediately upon the surface, and are found in the overstrain to which so many of the business-men of the present day are subjected. Sometimes it is domestic care or domestic infelicity, the existence of which may be sedulously concealed. Not infrequently the intense study and the anxiety of mind preceding a school or college examination are the cause. But the most difficult cases to investigate are those in which the exhaustion arises from sexual causes. Indeed, in such cases we may be able to arrive at the truth only by a process of exclusion. But, having reached a reasonable degree of certainty, the matter must be approached directly and a full understanding arrived at.

The cause having been removed so far as this is possible, the next question is that of diet. Usually the patient has a repugnance to the use of animal food, and he may not be able to digest it perfectly if taken. But when this is not the case nitrogenous food should enter pretty largely into the diet. If not acceptable in a solid form, it may be given as a liquid. An appetite for it may be encouraged by the exhibition of bitter tonics, and its digestion may be assisted by the use of pepsin and the mineral acids. It is highly important, however, that the digestion should be as perfect as possible, and theoretical considerations should be sacrificed to this whenever necessary, that form of diet being allowed which will give rise to the least digestive disturbance.

It should be borne in mind that it is not the excretion of phosphorus that the patient is suffering from, but the disintegration of tissue by which the element is liberated. We are not to be misled into

This is not remarkable when we consider the rôle played by cerebral irritation in both affections.

withholding food containing phosphorus in order that less phosphorus may appear in the urine. On the contrary, so long as the waste must continue it is better to supply an abundance of phosphorus, lest there should arise a deficiency of that element in the tissues. Hence in part the value of animal food. For this reason also whole-wheat flour is to be preferred to that which is made only from the interior of the kernel, which is almost destitute of phosphorus.

In the way of hygiene everything should be done that tends to increase the general vigor. Systematic exercise in the open air is to be advised, reference being had, however, to the general malnutrition and the necessity of avoiding excessive exertion. Bathing, especially in salt water, is to be recommended, the temperature of the water being as low as is consistent with complete subsequent reaction.

In cases in which the condition has been brought about by mental overstrain occupation should be provided which will amuse and entertain without taxing the mental powers. For this purpose travel, deliberately and quietly pursued in the company of a cheerful and congenial companion, will often be of the greatest service. But in extreme cases the absolute rest obtained by Dr. Weir Mitchell's method may be employed with advantage.

In the employment of drugs our chief reliance will be upon tonics and the mineral acids; and of the latter phosphoric acid perhaps deserves the preference. The familiar preparation of cod-liver oil, emulsified with hypophosphites and containing iron, is especially serviceable. Hypnotics should be employed with caution if at all, as there is danger of creating a dependence upon them. Generally they will not be required, the insomnia yielding as the other symptoms improve.

## Chyluria.

The presence in the urine of fat in a state of minute division, giving to the fluid the appearance of milk, constitutes the condition known as chyluria. The proportion of fatty matter varies within wide limits, and when the amount is very small the opalescence which it occasions may be mistaken for the milkiness caused by excess of amorphous phosphates. On standing, however, the fat rises to the surface, forming a distinct layer. A tendency to spontaneous coagulation indicates the presence of fibrin derived from the blood, and blood-corpuscles may be present in quantity sufficient to impart a reddish color.

The manner in which the chyle finds access to the urinary passages cannot always be made out. In a large number of cases the affection has been found associated with the presence in the blood of multitudes of minute parasitic worms about $\frac{1}{70}$ of an inch in length, called filariæ sanguinis hominis. These are the embryos of a larger worm, the filaria

Bancrofti, which is occasionally found in lymphatic abscesses or in the fluid of hydrocele in persons whose blood contains the embryos. It is surmised that through the agency of these minute animals a communication is established between the lymphatic system and the urinary passages at some point, and probably most frequently in the kidney itself. But there are many cases in which the presence of the parasite (found usually only during the night) cannot be demonstrated, and in which the mode of production is at present unknown.

The treatment in the cases infested with the parasite would naturally include efforts to destroy the filariæ in the blood. As yet, however, no agent is known sufficiently powerful to effect this result, and which at the same time could be safely employed. It would seem that the inhalation of ether or some other anæsthetic might have a destructive action upon the intruders. With a view to closing the communication between the lymph-channels and the urinary passages astringents have been employed, both internally and as injections into the bladder. This treatment has been in a measure successful in the hands of various practitioners. Bence Jones found gallic acid especially useful. Goodwin reported a case in which this remedy rendered the urine clear whenever it was given, but the milky appearance returned when the medicine was discontinued. Waters also was successful in a case in which he gave 30 grains of gallic acid daily, afterward increasing to 138 grains. Other astringents have been employed, such as tannic acid, acetate of lead, nitrate of silver, the mineral acids,[1] etc. A case of chyluria with presence of the parasites is reported by Lawrie, in which, after failure of other treatment, success was obtained by the use of thymol in 1-grain doses, afterward increased to 2 grains. Under this treatment the filariæ disappeared in a few weeks. In another case, in which the blood was not examined for filariæ, the syrup of the iodide of iron was given in full doses, and the urine became normal in appearance at the end of nine weeks.[2]

In some cases retention of urine is produced by the coagulation of the contents of the bladder. When this takes place, as large a catheter should be passed as the urethra will admit, to which an aspirating syringe is to be adapted. By alternately injecting and withdrawing a warm solution of sodium bicarbonate the coagulum is readily broken down and removed.

As the filariæ in the blood are embryos of the larger parasite already in the body, and as they cannot develop beyond the embryonic state within the system, it follows that with the death of the parent the production of offspring must cease, and as these in turn perish a spontaneous cure will sooner or later take place. The affection very rarely

[1] Tyson, Pepper's *System of Med.*

[2] Smith, *Annual of the Univer. Med. Sciences*, 1891.

proves fatal or even causes serious inconvenience, and in most cases its existence is not attended by any other symptom than the peculiar condition of the urine.

## Albuminuria.

Albuminuria, considered as a distinct affection—that is to say, not as a mere symptom of nephritis—occurs in the course of certain infectious diseases, such as diphtheria, typhus, etc., and in non-infectious diseases in which there is acute obstruction to respiration. It also occurs in pregnancy and in cases of large abdominal tumors, the mechanical conditions (pressure, etc.) having more or less to do with its production. Albumin is also found in the urine after the use of anæsthetics, after large doses or protracted use of opium, and after severe and sustained muscular effort.

Aside from these causes, there is transient albuminuria without organic disease, which is classified by Goodhart[1] as follows: "(1) *Oxaluric*, in which the albumin may be derived from the mucous surface being scratched by the sharp edges and corners of the crystals. (2) *Lithæmic*, which may occur at all ages, the result, especially in children, of too heavy feeding on solids, without sufficient liquid being taken with the food. (3) *Hæmoglobinuric*, in which, instead of the blood-colored urine of hæmoglobinuria, albumin is passed. It is sometimes caused by a cold bath. (4) *Extra-renal albuminuria*, or albuminuria derived from the genito-urinary passages, as in women by leucorrhœa and in men by gleet or other venereal discharge; but in many it is only the natural seminal fluid or prostatic secretion. The albuminuria in these cases is present only in the early morning. (5) *Neurotic albuminuria.*" Goodhart considers the theory of causation of the latter to be "the exhaustion of the higher brain-centres from work and worry; the lower centres, being relieved, so to speak, of the inhibitory influence of the higher centres, fall into a turbulent condition, and hence cause an intermittent discharge of albumin—a condition analogous to the flushing of neurotic women."

The question whether there is such a thing as *physiological* albuminuria is being much discussed. The weight of opinion seems to favor the conclusions expressed by A. J. Smith:[2] "While the opinion as to the existence of an albuminuria of slight significance, curable in nature and preventable by hygienic measures, is as strongly expressed and upheld, there is no doubt that the bulk of evidence would lead one to catalogue the majority of these cases either as of pathological origin, or, if permitted to continue, as having a pathological end."

On the other hand, to the question, "Does albuminuria occur in

[1] *Yearbook of Treat.*, 1891. [2] *Annual of the Universal Med. Sciences*, 1890.

healthy persons?" Saundby quotes Stirling[1] in the affirmative, and says: "His observations were conducted on such a scale as to give them great value. He used various reagents, but preferred boiling and acetic acid to all others. He examined 461 persons (of whom 369 were boys), and of these 118 had albuminuria (of whom 77 were boys). He noted the absence of tube-casts."

In the opinion of the writer there is one thing necessary as preliminary to the settlement of this question, so important in its therapeutical as well as its pathological bearings—viz. that there shall be an agreement among observers as to how much shall be included in the term "albumin." Until this be effected the discovery of each new and "more delicate" test vitiates all previously accepted conclusions, and the boundaries of renal disease must shift with each advance in the art of obtaining precipitates in the urine.

In health nearly all persons take more food than is necessary, and, as a consequence, more nutritive material finds it way into the blood than is required for the wants of the system. It is probable that no inconsiderable portion of the nitrogenous part of this excess passes out through the kidneys without ever having entered into the tissues. At least this much is certain, that normal urine contains, as a rule, a considerable amount of albuminoid material. Only in exceptional cases can this material be demonstrated with heat and nitric acid, but it can nearly always be precipitated by agitating the urine with ether or chloroform. With ether the precipitate appears as an opalescent gelatinous coagulum, which slowly rises to the top of the fluid. With chloroform there is a dense white chalky precipitate, which settles at the bottom of the tube.[2] How closely allied these are to albumin is shown by the fact that a watery solution of Merck's "pure serum albumin from blood" gives exactly similar precipitates.[3]

Such a solution, acidulated with acetic acid, gives only a very slight precipitate on boiling, but yields a dense coagulum when nitric acid is added. This coagulum being filtered out and the filtrate agitated with ether, a precipitate is formed less dense than in the former case—*i. e.* before the use of heat and nitric acid—but still very distinct. Removing this and agitating the remaining liquid with chloroform, still another precipitate is thrown down. Finally, if to the clear liquid above this precipitate a strong solution of mercuric chloride is added, distinct opalescence results. Here, then, we have from the same solution of

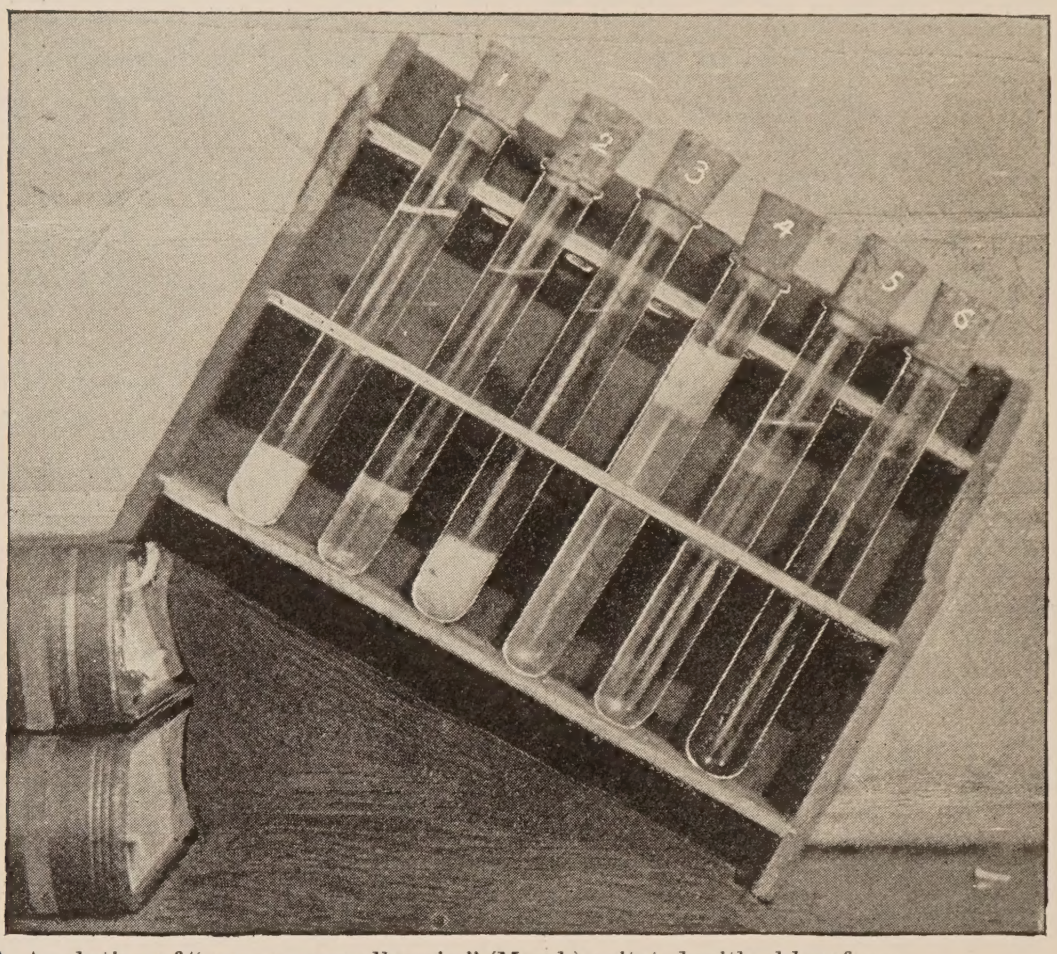
[1] *Internat. Med. Annual*, 1889.

[2] This is rather an emulsion than a precipitate, but the emulsifying substance leaves a substantial residuum when the chloroform is evaporated.

[3] As long ago as 1858, Gigon called attention to the presence in healthy urine of a substance coagulable by chloroform. This coagulum, collected and dried and redissolved in acetic acid, gave, with ferrocyanide of potassium, the reactions of albumin (Harley, *The Urine and its Derangements*, 1872).

pure serum albumin a slight precipitate with heat, a second (dense) precipitate with nitric acid, a third with ether, a fourth with chloroform, and a fifth with mercuric chloride. We may vary these experiments by using a solution of white of egg or a cold infusion of muscle of beef, but the result will be essentially the same.

Fig. 3.




No. 1. A solution of "pure serum albumin" (Merck) agitated with chloroform.
No. 2. Some of the same solution treated with heat and nitric acid, filtered, and agitated with chloroform.
No. 3. Normal urine agitated with chloroform.
No. 4. Same solution as No. 1, treated with ether instead of chloroform,
No. 5. Same as No. 2, except that ether was used instead of chloroform.
No. 6. Normal urine agitated with ether.

The test-tubes are inclined, in order to show the density of the precipitates. In No. 5 it will be observed that the precipitate preserves the original level, while the ether above it conforms to the inclination of the tube. Tubes 4 and 6 could be completely reversed without spilling.

How far the number of different precipitates might be extended by using a greater number of agents the writer has not had leisure to determine; but from the above observations, coupled with the impossibility which chemists have encountered in their efforts to fix upon a formula for albumin, he feels justified in drawing the inference that *there is no body of definite, unvarying composition to which the name "albumin" can be attached, but rather that we have to deal with a transition substance whose exact composition changes by insensible gradations as the transition advances, and that any given specimen is simply a mixture of various gradations, some of which respond to one test and*

*some to another.*[1] He finds that nearly all the specimens of urine sent to him for examination give these reactions with ether and chloroform, whether reacting to heat and nitric acid or not. It seems, therefore, obvious that albuminoid material in different stages of elaboration finds its way into the urine of multitudes of healthy persons, and that drawing the disease-line at coagulation by this or that agent is purely arbitrary. If the presence of substances coagulable by other agents is physiological, it is hard to believe that the presence of anything that is coagulated by heat and acid is, *for that reason,* evidence of disease. This would be to establish a chemical standard of health rather than a vital one, and to classify a substance in the urine as physiological or pathological not according to its relations to the economy, but according to its behavior in a test-tube.

However, experience teaches us that the presence in the urine of a substance coagulable by heat and acid is apt to be associated with structural change in the kidneys. Therefore in relation to treatment it is wise to regard even the slightest response to these agents as calling for a most careful examination of the case, not only as to the condition of the kidneys, but also of the digestive organs, the skin, and, in fact, of the entire system. The kidneys should not be condemned on chemical evidence alone. The microscope should be called in, and frequent and careful search should be made for casts or epithelial débris. If not found, their absence will go far to remove suspicion from the kidneys. The digestion should then be carefully investigated. Dyspepsia in any of its forms should be relieved as far as possible. Especially should any signs of inaction of the liver receive attention. The diet should not contain an excess of animal food, and the appetite should be restrained within moderate limits. Out-door exercise should be insisted upon, but not to the extent of producing extreme fatigue. The skin should be carefully protected and kept active by frequent hot or Turkish baths.

The albuminuria which occurs in the course of infectious diseases does not require special treatment. It may be considered, however, as emphasizing the demand for antiseptic measures.

The albuminuria of pregnancy does not of itself call for interference, but if the elimination of urea is seriously lessened or if signs of uræmia occur, the treatment already described for these conditions should be

[1] In a case of contracted kidney of long standing now under the care of the writer the urine for Aug. 22, 1891, measured 52 ounces, while the specific gravity was only 1003. Heat and nitric acid gave merely a trace of albumin, but agitation with chloroform caused a precipitate which, after standing twenty-four hours, equalled one-fourth of the bulk of the fluid. The precipitate from 1 ounce of the urine, collected and dried at a temperature of 150° F., weighed 1 grain. Here, then, is a patient passing 52 grains of albuminoid material daily, while the amount of *albumin* is scarcely appreciable.

resorted to. If it fails, the uterus should be emptied of its contents at the earliest practicable moment.

Albuminuria is a not infrequent accompaniment of malaria. It may be present continuously or only after a paroxysm. It yields usually to the treatment appropriate to the underlying disease.

In oxaluria and in lithuria a small amount of albumin will occasionally be found in the urine, due probably to the irritation caused by the angular crystals as they pass through the renal tubules. This form of albuminuria will cease at once when the cause is removed. A few doses of nitro-muriatic acid in the one case, and of an alkali in the other, will generally suffice to do away for the time being with all trace of the affection.

Neurotic albuminuria has no serious significance, and its treatment is comprised in that of the general neurotic condition with which it is associated. Antipyrine in moderate doses, repeated several times a day, seems to have a quieting effect and may render valuable service.

Functional albuminuria, or albuminuria of adolescence, is renal in origin, but otherwise negative so far as casts or symptoms of Bright's disease are concerned. It is more frequent in boys. The amount of albumin varies greatly. It may be equal to one-half the bulk of the urine tested. It is increased by taking food, and especially by fatigue. It is usually absent after the person has occupied for some time the recumbent position. This suggests that it may be due to the influence of the upright position upon the renal circulation. Tyson,[1] however, considers it as due rather to a defect in the composition of the albumin in the blood arising from malassimilation, and as a result of which defect it transudes through the walls of the vessels. It seems not to interfere seriously with the general health, and it tends to disappear after a time spontaneously.

The treatment is mostly hygienic, including a careful regulation of the habits of the patient as regards athletic sports, late hours, and all those excessive demands upon the strength to which the youth of the present day are so largely addicted. In addition to this a tonic course of iron, quinine, arsenic, etc. is indicated.

Extra-renal albuminuria might be passed over here, as the recognition of its source supplies the indication for treatment. But to fail to recognize it as extra-renal, and to mistake it for an evidence of kidney disease, is a serious error which should be carefully guarded against. In women suffering from leucorrhœa the parts should be cleansed by sponging before the specimen of urine to be examined is passed, and if the discharge is profuse it is well to insert a pledget of cotton between the labia as an additional precaution. In any case of urethral discharge the urine first passed should be rejected. Finally, if after all these pre-

[1] *Annual of the Univer. Med. Sci.*, 1888.

cautions have been taken pus-corpuscles are found in the urine, the bladder should be washed out, and the first urine which passes into it after the washing should be secured for examination.

Severe muscular exertion will often give rise to albuminuria of short duration. This, together with the impediment to respiration which occurs in an epileptic attack, will account for the albumin in the urine which commonly follows an epileptic seizure. This might be taken as an indication that the convulsion was uræmic if dependence were placed upon a single examination. The history of the case, however, and usually the absence of casts, will help to a correct diagnosis. Treatment is not required.

Albuminuria may be associated with chronic constipation, in which case Ralfe considers that it is due to absorption of toxic material from the fæces. Treatment directed to the constipation will remove the albuminuria at the same time.

Albuminuria in a child having elongated prepuce has been cured by circumcision.[1] Indeed, almost any abnormal condition may be suspected to hold a causal relation to a coexisting simple albuminuria, and to afford an indication for treatment.

In any case of albuminuria, if the loss of albumin is sufficient of itself to affect the patient, means should be adopted to reduce the waste. For this purpose astringents may be employed, tannic and gallic acid being the ones most frequently selected. Saundby and others have found the tannate of sodium useful. Mineral astringents also are useful, and especially the astringent preparations of iron. These latter have an additional value on account of their effect upon the anæmia so generally present. Ergot is thought to do good by contracting the vessels, but Stewart has tested its supposed value and found it wanting. He has not been more fortunate with belladonna. The hydrochlorate of rosaniline, if carefully and perseveringly used, has appeared in some of his cases to be distinctly useful.[2] Still, it must be confessed that our control over the waste of albuminous material through the kidneys leaves much to be desired.

## Lithuria.

Every physician in active practice constantly meets with cases like the following: A person, usually above thirty years of age, complains that while not actually sick he seldom feels entirely well; he is dyspeptic, his appetite is variable; at times he enjoys his food, but after eating there are discomfort, acid eructations, gaseous distension, heartburn, a bad taste in the mouth. He is apt to be constipated and the movements are ill-smelling. Very likely he has hæmorrhoids, and he may be tormented by itching of the anus. Not infrequently there is eczema, espe-

[1] *Internat. Med. Annual*, 1890. [2] *Clinical Lectures on Albuminuria*, 1888.

cially about the genitals. He complains of drowsiness and mental inertia, but at the same time he feels irritable and peevish. Little ills assume to him a great importance, and he is liable to periods of despondency. He has a great deal of headache, and is often giddy and "things grow dark" before him. He is subject to neuralgic attacks, especially of the intercostal nerves; his limbs ache and there is a general sense of lassitude and weariness. On examination the tongue is found to be coated and the conjunctivæ slightly yellow and perhaps injected. The skin is muddy, and may be the seat of a papular eruption more or less abundant. Often the liver is somewhat enlarged and slightly tender. The pulse in many cases is felt to be hard and tense, and the second sound of the heart is accentuated. The urine is apt to be rather scanty and high-colored, and of a specific gravity above the average; but in cases of long standing in which the kidneys have become involved the quantity may be large and the specific gravity correspondingly low. The reaction is strongly acid. On standing there is a deposit of urates and uric acid. The latter appears as a brownish or reddish sediment, and often clings to the bottom of the vessel as a pink stain which is not easily removed. On account of these peculiarities the urine becomes irritating to the bladder, and micturition is frequent and accompanied by pain and scalding. There may be also a sense of weight and aching about the kidneys, due to the same irritation. A small amount of albumin may be found now and then in the urine, due to mechanical irritation from the uric-acid crystals.

Now, this complex of symptoms, subjective and objective, is found to be associated with the formation of an abnormal amount of lithic acid, which, when appearing in the urine, constitutes lithuria, while the general condition is designated as lithæmia. It is a frequent forerunner of gout, and if not checked is pretty sure to end in contracted kidney.

The pathogenesis of this condition is the subject of much difference of opinion. For our purposes it will be sufficient if we consider that uric acid is formed in excess whenever more albuminoid material is taken than the system is able to convert, or when, on the other hand, the supply of oxygen is relatively insufficient. The circumstances which may bring about either of these conditions are numerous and varied, and it is often difficult in a given case to determine which of the possible causes are or are not active; and yet upon the accuracy of this determination will depend much of the success of our treatment.

The digestive disturbances are the most salient feature, and it may be said in general terms that when these are overcome the cure is practically accomplished. The first thing to be considered is the diet, and here we will find that there is no single rule that is applicable to all cases. At first sight it would appear that as uric acid is derived chiefly from the nitrogenous elements of the food, it would meet the case suf-

ficiently if these were measurably withheld. But the matter is not so simple as this would imply. It is, above all things, necessary that digestion be perfectly performed, failure in this respect causing more defective metabolism than could possibly arise from a little more or a little less of some particular element in the food. Now, it is a matter of common observation that with most persons lean meat is more easily digested and assimilated than starchy, saccharine, or fatty substances. Indeed, in the case of these three classes of foods, if digestion is slow it is certain to be anticipated by fermentation, and the resulting acids, being taken into the blood, derange to a greater or less extent the whole chemistry of nutrition and disassimilation. In the majority of cases, therefore, it will be found that a diet containing a considerable proportion of albuminous material, supplemented by the succulent "green" vegetables, will be more easily digested than one in which the starchy and saccharine elements greatly predominate. This is especially true of those cases in which the dyspeptic symptoms develop only after an interval of an hour or two has elapsed since the taking of food, and are marked by flatulence, headache, and drowsiness. These are the distinguishing features of intestinal indigestion, and may be taken to indicate that the carbohydrates are undergoing fermentation in the intestinal canal.

But there are cases, on the other hand, in which the discomfort develops immediately after eating. There is a sensation of weight, or even of pain, in the epigastrium, and acid and gaseous eructations, with heartburn, persist for some time after the meal. Here the fault is in the stomach, and animal food, which makes the principal demand upon stomach digestion, will have to be greatly restricted or entirely abandoned. Sometimes a middle course may be adopted, and the white meat of fowl, sweetbreads, and fish may be allowed, while the heavier meats are discarded.

Fatty substances are very apt to disagree, and to give rise to butyric-acid eructations of a peculiarly acrid and disagreeable character. Rich food, pastry, etc. must then be absolutely excluded from the diet.

In short, the diet must be carefully studied, and only those articles retained that are found to be most easily digested and assimilated. In peculiarly obstinate cases it may be well to resort to predigested foods.

Stimulants of all kinds are to be avoided, as they tend rather to increase the difficulty than to relieve it.

In the administration of drugs two varieties of the affection are to be recognized, which require different treatment. The first is marked by the presence of gastric and hepatic derangement, without any decided disturbance of the nervous system. Patients of this class are of a plethoric habit, usually gross feeders, and leading indolent, sedentary lives. The second variety presents, in addition to the dyspeptic symp-

toms, evidences of decided nervous implication. These patients, though not necessarily of slender build, are likely to be small eaters even in health, and under the influence of their malady fall into the habit of taking extremely little food. They consequently become anæmic and lose strength, and in this condition fall a prey to a variety of nervous derangements. Prominent among these are headache, vertigo, insomnia, melancholia, irritability of temper, neuralgia, and all the various symptoms that go to make up the familiar picture of neurasthenia.

Now, in the first class of cases saline purgatives in the beginning of the treatment are exceedingly useful. They should be given in sufficient quantity to secure two or three loose watery movements in the twenty-four hours. Sir H. Thompson insists upon the special value of sodium sulphate as increasing glandular elimination more decidedly than any other saline cathartic. After the portal system has been thoroughly relieved by these means the liver may be stimulated with advantage by the use of mercurials in moderate doses, the mineral acids, or the vegetable cholagogues, such as podophyllin, euonymin, etc. German practitioners place much reliance upon ammonium chloride as a cholagogue, and the writer has found it very useful in numerous instances. It may be given in daily doses of 1 or 2 drachms.

Accompanying or following these latter remedies the alkaline mineral waters are found most useful. Of these, the Vichy and Carlsbad are much employed abroad, while in America the lithia waters are fast displacing all others. There seems to be good reason for this, as the very low equivalent of lithia gives it a much greater neutralizing power, weight for weight, than any other of the alkalies. For this reason it is effective in smaller quantity, and it follows that less demand is made upon the kidneys in excreting the resulting salts. The principal lithia springs are, in the order of their strength, the Londonderry, the Farmville, and the Buffalo.

It is not necessary, however, and it may not always be convenient, to give the alkali in the form of a mineral water. Excellent results may be obtained by giving a simple solution, either of a carbonate or of a salt formed with an organic acid, such as a tartrate, citrate, or acetate, the acid in these cases being broken up and the base acting as if it had been given uncombined. Theoretically, potassa is preferable to soda, as forming salts that are more soluble, but, on the other hand, it is more depressing than soda when given for a lengthened period. A favorite plan of the writer in cases of no great severity is to direct that a tea-spoonful of sodium bicarbonate be taken in two-thirds of a glass of water every night on going to bed. It is surprising how many habitual headaches and other bad feelings in lithuric persons may be gotten rid of by means of this simple prescription. The use of the alkalies should be continued for some weeks in doses sufficient to keep

the urine but faintly acid at all times, except after meals, when it should be slightly alkaline.

In cases belonging to the second class, in which the nervous disturbances predominate, this portion of the treatment should be varied, in that purgation should be avoided, only gentle laxatives being employed. Alkalies or alkaline waters also should not be pushed to the same extent, the aim being to conserve the already depreciated forces. In these cases the mineral acids, and especially nitric acid, have a prominent place. The latter may be given in doses of 10 to 20 drops of the dilute acid before each of the principal meals. It may very appropriately be combined with a simple bitter tonic, as in the following formula:

| | |
|---|---|
| Acidi nitrici dil., | f℥j; |
| Tinct. gentian. comp., | f℥viij.—M. |

Sig. Two tea-spoonfuls in water before each meal.

Sodium phosphate is a valuable solvent of uric acid, and is recommended by Dr. A. Haig[1] as especially useful in the mental depression so often attending the uric-acid diathesis. It should be given with sodium bicarbonate.

Colchicum has long had the reputation of aiding the elimination of uric acid by the kidneys. It is chiefly useful in cases in which, the acid being in excess in the blood, the kidneys seem to be unequal to the task of throwing it off. This occurs principally when the function of the kidneys is impaired by exposure to cold and wet or by excessive fatigue, or is overtaxed by excess in eating and drinking. In such cases the administration of colchicum will be followed by an increase in the amount of uric acid in the urine and by a degree of relief of the general symptoms. The remedy, however, is very apt to irritate the stomach, and, in the experience of the writer, should not be employed until the dyspeptic trouble is measurably controlled. Too early resort to it has in his hands led to serious temporary aggravation of the gastric derangement.

A not uncommon condition in lithuria is that in which the dyspepsia is associated with cardiac palpitation and obstinate insomnia. If the common foundation of this triple alliance is overlooked, the palpitation and the insomnia are apt to be regarded as independent affections, and cardiac sedatives and hypnotics to be dispensed with a liberal hand, but with a most unsatisfactory result. Here lavage has been found by the writer to be of the utmost value. Practised daily for a week or a fortnight, it will often change completely the aspect of the case. It is not alone the local effect produced upon the stomach,

[1] *Lancet*, vol. i., 1889.

but, the entire mucous surface being flushed with a quantity of water at a temperature sensibly higher than that of the body, the absorption is very rapid; and a large amount of fluid is thrown rapidly into the portal circulation, with the effect of thinning the bile and promoting its discharge. In more than one instance under the writer's observation a good night's sleep has followed the day on which this treatment was first employed, and the improvement thus begun has been permanent. In one case the patient had taken enormous quantities of potassium bromide without procuring sleep, and his suffering from insomnia had reached such a point that he was tempted to destroy himself.

Lithuria being a condition of imperfect oxidation, exercise in the open air is in general to be recommended. Indeed, it is the *sina quâ non* for plethoric persons of full habit. The more such patients live and exercise in the open air, the better. But the case is different when nervous derangement is the leading factor and there is a tendency to neurasthenia. Here rest of mind and body is essential, and, while out-of-door airing is desirable, it must be under conditions which make the least possible demand upon the strength. Indeed, the necessity for rest may be so imperative that it will be better to put the patient to bed for a few days at the beginning of the treatment (Gray).

In this class of cases the inhalation of oxygen is capable of effecting valuable results. This is one of the rare instances in which *a priori* reasoning has led to conclusions which clinical experience afterward proved to be correct. Uric acid representing a lower degree of oxidation than urea, it was natural to expect that the introduction of a larger proportion of oxygen into the blood would result in the production of more urea and less uric acid. That this is actually the case has been amply demonstrated by experiment and by clinical observation. Two or three gallons of oxygen largely diluted with air and very slowly inhaled will have a decided influence in these neurasthenic cases in lessening the amount of uric acid in the urine. The inhalations may be repeated once or twice a day.

## Oxaluria.

Oxalic acid in the form of crystals of calcium oxalate is found in the urine under a great variety of conditions. Thus it may result from the ingestion of vegetable substances containing oxalic acid, such as tomatoes, sorrel, rhubarb, onions, and turnips, or it may be the product of incomplete oxidation of the saccharine, starchy, and fatty elements of the food. Again, it is probable that changes taking place in the mucus of the urinary passages may result in the formation of crystals of oxalate of lime. In this way may be explained the large quantities observed in the composition of urinary calculi. Still further, oxalic acid may result from the decomposition of uric acid

under the action of certain ferments occurring in the urine, and this may take place long after the urine is voided (Parkes). Beale considers that the dumb-bell crystals of oxalate of lime occur principally in the uriniferous tubes, since they are found so often imbedded in casts.[1]

But there is a condition with a persistent tendency to the formation of an excess of oxalic acid in the system apart from the character of the food ingested. There is present in these cases a form of dyspepsia marked by irregularity of the bowels, "constipation alternating with a colicky diarrhœa of a frothy character, and not infrequently accompanied with considerable discharges of blood." The urine, normal in quantity and specific gravity, is usually of a pale greenish color, and contains crystals of oxalate of lime, more abundant in the urine which accumulates during the night. Occasionally a trace of sugar is present. In addition to the dyspeptic symptoms there are great mental depression and hypochondriasis.

The irritation produced by the crystals in the urine causes frequent micturition, with more or less of a burning sensation in the urethra.[2] In this form the oxalic acid is doubtless formed during the process of digestion and assimilation, and is another example of chemical action proceeding side by side with vital function and vitiating in a measure its result. The patients in whom these phenomena are observed are usually overworked, careworn, ill-nourished, or inhabit damp and badly-drained localities. In short, it is a condition which presupposes depression of vitality, and is in sharp contrast with the conditions with which lithuria is associated.

The treatment is based upon the cause, if that can be ascertained. When dependent upon the use of food containing oxalic acid, it will be sufficient to exclude these articles from the diet. When due to increased tissue-change, as shown by high specific gravity of the urine with undiminished quantity, the causes of this must be sought for and appropriate treatment adopted. If connected with an excess of mucus in the urine, it will be necessary to determine from what part of the urinary tract this arises, and to endeavor to overcome the catarrhal condition. In cases not of a surgical nature this may often be effected by the use of stimulant and alterative diuretics, such as turpentine, buchu, uva ursi, copaiba, etc.

When associated with the dyspeptic condition already described the treatment must be addressed to the gastro-intestinal catarrh. Here lavage will give excellent results. It should be repeated daily if

[1] Aitken (*Practice of Medicine*) says: "In order that oxalic acid shall form in the urine there must either be irritation from a calculus or some other cause, or there must be fermentative changes from mucus. If there be no evidence of either of these conditions, the oxalic acid of fresh urine may be presumed to come from the blood."

[2] Ralfe, *Morbid Urine*, London, 1882.

practicable, and continued until the washing ceases to bring away an excess of mucus. If for any reason lavage is not practicable, a measure of benefit may be derived from drinking three-quarters of a pint of very hot water half an hour before breakfast each morning. To this may be added a tea-spoonful of Carlsbad salt, as recommended by Ralfe. Nitro-muriatic acid has been a favorite prescription in these cases ever since the days of Prout. It is perhaps more useful than any other single medicine in the treatment of oxaluria. It has a double action, the hydrochloric acid promoting the digestion of the proteids, while the nitric acid acts as a special stimulant to the liver. It should be largely diluted, and given just before or just after meals. In the opinion of the writer the initial dose should not exceed 20 minims of the dilute acid, as there is danger that a large dose will retard digestion by acting chemically upon the gastric juice.

To act upon the intestinal canal as an antiferment salol is especially useful, as it is not dissolved until it has passed the pylorus and come into contact with the alkaline secretion of the pancreas. The bowels should be kept free and an efficient action of the liver assured. Tonics, such as iron, quinine, and strychnine, will generally be useful. Ralfe recommends cold-water pads to the abdomen at night. Cold bathing followed by brisk friction may be called for.

The sanitary condition of the residence should be thoroughly looked after, and good ventilation and freedom from dampness should be secured. As far as possible all depressing mental and bodily influences are to be removed. The food should be nutritious and digestible, and should embrace a liberal proportion of nitrogenous substances. Sugar and starch are to be partaken of very sparingly. But little fluid should be taken with the meals. Tea is peculiarly liable to excite fermentation, and is perhaps partly responsible for the oxaluria so common among the poor, who live largely upon tea and bread. Coffee in moderation may be tentatively permitted, but alcohol is injurious. Outdoor exercise and a sufficient number of hours devoted to sleep should be insisted upon. In fact, whatever contributes to the mental and bodily health will act beneficially upon the special affection.

## Diabetes Insipidus.

Strictly speaking, diabetes insipidus includes only that condition in which there is a long-continued excretion of an excess of non-saccharine urine. This condition may be taken to imply an anatomical lesion analogous to that of diabetes mellitus. But there may be a very large flow of urine for a shorter period without any such lesion and depending upon a temporary neurosis. In such cases the condition is not an essential one, but is merely symptomatic, and ceases when the irritation of which it is a reflex is removed. But as polyuria is the salient fea-

ture both in the essential and the symptomatic condition, the question of treatment will always require a differentiation between the organic and the functional forms. This makes it convenient too for our purpose to regard polyuria as the unit and the various forms as subdivisions.

As we arrive at a diagnosis of essential polyuria mostly by excluding the other forms, it will be convenient to consider the latter first. Functional polyuria occurs principally in persons of a neurotic temperament, especially females, and in association with other visible disturbances of the nervous system. Nervous or emotional excitement, hysteria, migraine, all are apt to be at times accompanied or followed by the discharge of a large amount of urine. Under these circumstances the condition is of short duration and calls for no special treatment. Various affections involving irritation of the renal or pelvic organs give rise to an increase of urine which may amount to polyuria. Thus Peyer quotes a case cited by Ultzmann in which a woman with endometritis passed forty-two pints daily. Many surgical affections of the bladder and prostate act in a similar way.

The treatment of reflex polyuria is included in that of the condition which gives rise to it, and with the removal of the causal irritation the excessive secretion may be expected to cease. Pending this, however, such general sedative measures may be employed as will be indicated in connection with the treatment of the essential form.

Essential polyuria, or true diabetes insipidus, depending upon a lesion of the nerve-centres or nerve-tracts—which lesion, however, may not be traceable in the cadaver—is usually very persistent or wholly incurable. Occasionally, nevertheless, cases occur in which the lesion is syphilitic, and in these recovery may take place under appropriate treatment. Hence in every case of diabetes insipidus diligent search should be made for signs of syphilis, transmitted or acquired, and if any such can be found the patient should be subjected to a thorough course of antisyphilitic treatment.

Tubercular meningitis is sometimes the source of an irritation of the medulla which may induce polyuria. If the patient can be brought through the meningitis, there is then every hope that the excessive flow of urine will cease.

Blows on the head or similar injuries not infrequently set up an action at the base of the brain which leads to polyuria. There is always a hope in these cases that there is an inflammatory exudation in the neighborhood of the fourth ventricle that may be removed by the action of absorbent medicines ; and the patient should at least have the benefit of the chance.

Except under the conditions mentioned above the treatment of diabetes insipidus consists for the most part in the use of such means as tend to lessen the susceptibility of the nerve-centres to irritation.

Among these opium and its derivatives have held the first rank until within a very recent period. For the last few years, however, antipyrine has come to be regarded by many practitioners as far superior to opium, not only as being really more efficacious, but as not causing the disturbance of digestion inseparable from the use of opium, and not exposing the patient to the risk of forming a vicious habit. Evidence is accumulating to show that this drug is capable of giving very great temporary relief, if not of effecting positive cures. It is employed in doses of 10 or 15 grains three times a day, and this may be continued for a long time without any unfavorable effect.

There is much testimony also to the effect that ergot, in doses of ½ drachm to 1 drachm of the fluid extract three or four times a day, is extremely beneficial in many cases. It is supposed that the ergot acts by contracting the renal vessels, and thus shutting off a part of the blood from the kidneys, but it is difficult to see how this action alone could produce the apparently permanent cures which have been noted.

Many other drugs have been employed with more or less success in combating this affection. Among these may be mentioned valerian, arsenic, sodium salicylate, strychnine, oil of turpentine, iodoform, nitric acid, etc. The application of galvanism over the medulla has been suggested by Nothnagel; also blisters to the same locality. Tonics are indicated to brace the system against the debilitating effects of the disease. For the dryness of the skin DaCosta applies vaseline.

In the matter of diet no benefit is derived from the restrictions so useful in saccharine diabetes. While limiting the amount of fluids taken will no doubt lessen the quantity of urine, it may well be doubted whether the gain is sufficient to compensate for the resulting discomfort. At the best, the patient is sufficiently tormented with thirst, and there is no evidence that his condition is actually improved by lessening the activity of the kidneys.

Everything should be done to secure the best hygienic conditions attainable: good food, an abundance of open-air exercise, bathing, cheerful company, pleasant mental occupation,—all these things contribute not a little to the successful management of the case.

But in estimating the effect of any plan of treatment it must be borne in mind that very many cases go on almost indefinitely, the patients suffering only the inconvenience which their drinking habits entail, and, so long as the supply of fluid is not restricted, appearing to be not much the worse for their infirmity. Apart from the underlying conditions upon which the polyuria may depend, there is nothing in the disease itself which tends to shorten life except the annoyance and interruption of rest to which the patient is subjected. In persons of very nervous temperament this wears rapidly, while those of a phlegmatic habit bear it with but little inconvenience.

# GONORRHŒA AND ITS COMPLICATIONS; STRICTURE; CYSTITIS; HYPERTROPHY OF THE PROSTATE; ATONY OF THE BLADDER; AND VESICAL CALCULUS.

By J. WILLIAM WHITE, M. D.

## GONORRHŒA AND ITS COMPLICATIONS.

A BRIEF review of the clinical history of urethritis, simple and specific (gonorrhœa), will aid greatly in simplifying the description of its therapeutics, and may be the more valuable in a work of the character of the present one as such cases so commonly come under the care of the general practitioner.

Recent researches seem to show a definite etiological relation between a particular microbe—the gonococcus—and gonorrhœa; but, although asserted by a large and an increasing number of authorities, this cannot yet be considered as absolutely demonstrated. The statement that the disease has been produced by inoculation of pure cultures of the gonococcus (the only scientific and demonstrative proof of such relation) rests upon experiments which are numerically insufficient to entitle it to unhesitating acceptance, though the weight of evidence is gradually accumulating upon this side of the question.

Clinically, however, we may assume that, in the majority of cases of acute urethritis, a mixed infection has occurred, and that gonococci, the microbes of suppuration, and other bacteria will be found intermingled, although occasionally the former are absent.

Inflammation of the male urethra may be thus either *simple*, in which infection with only pus-microbes has taken place, or *specific*, in which gonococci are also present.

*Simple urethritis* may be due to a great variety of causes. Authentic cases are recorded of well-marked urethritis following accidental or experimental exposure to leucorrhœal discharges; to the discharge resulting from ulceration or malignant disease of the uterus; to the menstrual fluid or acrid vaginal discharges; to powerful injections; to the passage of gravel; to catheterism; and to many other undoubtedly non-specific causes. The condition thus evoked is often indistinguish-

able clinically from that following sexual intercourse with a person already having a similar disease of the *specific* variety, many severe and complicated cases of gonorrhœa being derived from one or the other of these sources. As a rule, however, simple urethritis is somewhat less severe and less protracted, though great caution should be observed in drawing any inference as to causation from the character of a particular attack, as the variations observed in the different grades of urethritis are no greater than those which prevail among inflammations of other mucous passages, and which are due to individual idiosyncrasy or to differences in the power of the original irritant.

For convenience we may still further differentiate the varieties of urethritis according to their clinical course, dividing them into—1. Typical or acute inflammatory gonorrhœa; 2. Subacute or catarrhal gonorrhœa; 3. Irritative or "abortive" gonorrhœa.

**The acute inflammatory** variety is the one most frequently encountered, particularly in those persons who are for the first time affected.

The interval which elapses between exposure and the development of urethral symptoms is a variable one, extending from a few hours to twelve or fourteen days. In the great majority of cases, however, the disease appears during the first week. The patient notices a drop of milk-and-watery fluid at the meatus, which is slightly red and puffed or everted; a tickling sensation is often felt in this locality, and the next act of urination is attended with a feeling of warmth at the end of the canal or with actual scalding. After this the symptoms increase rapidly in number and severity, so that within forty-eight hours, or even sooner, the disease may be described as having gotten well into its first or "increasing" stage, the characteristic phenomena of which are as follows: redness, eversion, and often erosion of the lips of the meatus; scalding at each act of urination, or *ardor urinæ;* painful erection, or *chordee,* most frequent at night after the patient has become warm in bed; *frequent micturition* with vesical tenesmus, indicating an extension of the inflammation to the deep urethra.

As complications of the first stage we may meet with *balanitis,* the inflammation, instead of remaining within the urethra or involving only the lips of the meatus, having extended over the surface of the glans penis; *balano-posthitis,* a further extension of the inflammation from the surface of the glans to the inner or mucous layer of the prepuce; *phimosis,* or inability to retract the prepuce, often produced by the œdema of the preputial cellular tissue associated with the foregoing condition; *paraphimosis,* a condition in which the prepuce, retracted and caught behind the projecting corona glandis, cannot be brought forward, which is a less frequent, but more annoying and dangerous complication. These complications—balanitis, balano-pos-

thitis, phimosis, and paraphimosis—are by far the most frequent which make their appearance during this early period of the disease, and have accordingly been mentioned in their usual clinical order. The first stage, or that in which there is a progressive increase in the severity of the symptoms, is of variable duration, but under well-directed treatment commonly terminates in from five days to a week, after which, for a short time, the condition appears to remain stationary.

During the second or stationary stage the discharge is still profuse and the ardor urinæ and chordee marked. Patients complain that their comfort during the day is interfered with by urgent calls to urinate, and that their rest at night is disturbed by frequently-recurring erections. During this period, which may be said to extend on an average from the seventh or eighth day to the end of the second week, the inflammation is gradually extending backward, and may give rise to other complications.

Among these are *follicular* and *peri-urethral abscesses*, which may appear as small, round, tender tumors along the under surface of the urethra. They very often open internally, but now and then adhesion to the skin takes place, pointing occurs outwardly, and they discharge upon the cutaneous surface.

In a certain proportion of cases of gonorrhœa a simple *lymphangeitis* occurs as a result of absorption of purulent matter. It affects most commonly the lymphatics of the dorsum of the penis, and is almost invariably associated with neglect of cleanliness and retention of the discharge between the prepuce and the glans.

Either with or without this condition as a forerunner adenitis of one of the glands of the groin may be the result of gonorrhœa, or, in other words, we may have a gonorrhœal *bubo*. The gland affected is usually one of the superficial set, lying just below Poupart's ligament.

Another group of complications may occur toward the end of the third week or later. Inflammation of one or both of Cowper's glands —or *Cowperitis*—is a result of extension of the urethritis by continuity along their ducts, which empty into the posterior portion of the spongy urethra. The most marked symptom is usually a throbbing pain in the perineum, much increased by pressure and rendering sitting or walking markedly painful. Suppuration in the periglandular tissue sometimes occurs, in which case the usual signs of the formation of pus are present.

*Prostatitis* begins with a feeling of weight and distension in the perineum and rectum, soon followed by frequent urination, the end of the act being painful. Defecation is also painful, markedly so if the fæces are inspissated. As the disease progresses the pain increases, becomes throbbing when the patient is erect or in the sitting posture,

and is aggravated by evacuation of the bladder or rectum. The frequency and difficulty of micturition both increase, the latter sometimes proceeding to complete retention. The disease may terminate by resolution, the most frequent way, or suppuration.

An acute prostatitis may run into a chronic condition, which is very annoying and intractable. The same symptoms exist in a modified and much subdued form; the pain is replaced by a sense of weight and fulness; micturition is rather too frequent and is feeble, the last drops dribbling from the meatus; a mucoid discharge like the white of raw egg, but occasionally milky, may be squeezed from the urethra by deep pressure from behind forward, and the same discharge appears at the meatus after every evacuation of the rectum. By examination through the latter the gland is found to be somewhat enlarged and slightly tender on firm pressure.

A greater or less involvement of the neck of the bladder may pass into a well-developed inflammation of the mucous membrane of the vesical neck, constituting a *gonorrhœal cystitis*, the chief symptoms of which are very frequent urination, excessive vesical tenesmus at the end of the act, which is characterized by severe burning pain, and blood and pus following the stream of urine. There are usually few constitutional symptoms, little or no fever, and no rigors.

These complications belong in the majority of cases to the latter part of the stationary period of gonorrhœa, which extends over a period of from one to two weeks, rarely longer.

At the termination of this stage that of subsidence begins. Urination becomes painless and less frequent; the discharge grows thinner, becomes watery and scanty, or dries up altogether; erections no longer occur with abnormal frequency, and do not give rise to curvation of the penis or to pain. If any of the complications which have been described has existed, the last vestiges of it fade away and perfect health is restored.

But until this stage is actually completed there are yet certain difficulties which may present themselves.

Chief among these, in respect to frequency of occurrence, is *epididymitis* or *swelled testicle*, which in the majority of instances is the result of the extension of the urethral inflammation along the ejaculatory ducts and spermatic canal to the epididymis itself. The first symptom is an aching pain in the groin. The cord will be found to be tender on pressure. This preliminary pain is followed by a dull ache in the affected testicle, which rapidly becomes of great bulk, purplish in color, and exceedingly painful.

**Subacute or catarrhal gonorrhœa** occurs most commonly in persons who have had previous attacks of gonorrhœa. A patient with this variety of urethritis will present himself after a suspicious or an

unaccustomed connection with a free muco-purulent or purulent urethral discharge. He will complain of very little pain, possibly only of a sensation of warmth during urination. Chordee is absent or very slight, there is no vesical irritability, and complications are infrequent. Under treatment the discharge rapidly diminishes until only a drop or two of muco-pus can be seen, and that chiefly in the morning. This symptom is apt to linger in spite of all efforts to remove it, and is the most persistent, annoying consequence of this form of gonorrhœa. There are, however, some complications which, although they may likewise appear during an acute attack, are often associated with this catarrhal condition of the urethra, and which are of considerable gravity. These are gonorrhœal rheumatism, gonorrhœal ophthalmia, and gonorrhœal conjunctivitis.

*Gonorrhœal rheumatism* may appear at any time during the existence of a purulent discharge from the urethra: it is much more common in men than in women, develops suddenly, and is usually accompanied by some abatement of the discharge. The symptoms come on rapidly. The patient notices pain and swelling in an articulation, commonly the knee, ankle, wrist, or elbow, in order of frequency. Within a few hours the swelling, which is due to synovial exudation, increases; the joint becomes moderately red and hot and very tender, the suffering on touch or movement being great. It may remain in this condition for some time, involving neighboring tissues and producing a general arthritis; or may affect only the synovial membrane and subside rapidly. There are usually but few constitutional symptoms. The disease in a certain number of cases only develops vague travelling pains in joints, bones, and muscles, and does not produce well-marked local symptoms.

Associated with these joint-troubles in many cases, or occasionally occurring as the only complication of the urethritis, there is an inflammation of some of the structures of the eye known as *gonorrhœal ophthalmia.* The sclerotic coat, the iris, and the oculo-palpebral conjunctiva are the tissues chiefly affected, the symptoms being those of a common iritis or conjunctivitis, attended with aching pain and accompanied by a moderate amount of muco-purulent discharge. The usual remedies have a beneficial effect, but the disease tends to run a chronic course and to subside spontaneously. This complication should not be confused with the very different and much more serious condition of *gonorrhœal conjunctivitis*, although they are often spoken of as identical. The latter trouble is a result always of direct inoculation, the pus being transferred by the finger or otherwise to the edges or inner surfaces of the lids. The symptoms commonly make their appearance within a few hours, and at first resemble those of a simple catarrhal conjunctivitis. They increase with great rapidity, so that an eye which

twenty-four hours previously was healthy will be found with tense, œdematous, bulging lids, from between the closely-approximated edges of which a thick, purulent secretion is oozing; on separating them the conjunctiva is found injected and chemosed and bathed in pus. In a short time, if the chemosis is not relieved, the supply of blood being cut off from the cornea, the latter ulcerates in one or more spots or may become detached and fall out entirely, permitting a complete loss of the contents of the globe. This whole series of phenomena may occur within three or four days, and not infrequently has occupied only half that time. The pus from such an inflammation is intensely contagious, irritates the cheek over which it flows, and will, to a certainty, affect the sound eye if any be allowed to come in contact with it.

**Irritative or Abortive Gonorrhœa.**—Not infrequently, after a suspicious connection, a patient will complain of slight pain on urination and a little itching at the meatus. An examination discloses a reddening of the lips of the orifice and a little transparent secretion coming from the anterior half inch of the urethra. These symptoms are very similar to those of the earliest stage of an acute urethritis, and indeed are often indistinguishable from them—a fact of importance in deciding as to the propriety of "abortive" treatment. Instead, however, of increasing in intensity, they remain in *statu quo* for some days, and then, if not aggravated by improper treatment, subside entirely, the whole duration of the case not exceeding a week or ten days. There are no sequelæ and no complications associated with this condition, which is simply one of irritation and consequent hypersecretion.

**Chronic Urethral Discharges.**—These may, for convenience, be divided into three classes: those due to a urethral catarrh, a condition often left after the subsidence of an acute urethritis; those dependent upon a chronic gonorrhœa, the inflammation having localized itself in some portion of the urethra, producing a granular or even superficially ulcerated surface; and those commonly known as gleety, which in almost every instance will be found associated with urethral coarctations, often of the sort known as "strictures of large calibre." Nearly all chronic discharges arising from the urethra proper will be found to fall under one or the other of these heads, and, as it is a matter of much therapeutic importance to be able to distinguish them, their chief diagnostic points may be briefly considered.

Urethral Catarrh.—In many cases of gonorrhœa, for some time after the disappearance of the last drops of muco-purulent discharge, there will be found a condition of excessive secretion or of increased "urethral moisture," which will often be a source of unnecessary anxiety to the patient and to the surgeon. The symptoms asso-

ciated with this mucous catarrh vary from a mere feeling of wetness about the meatus to the possible production, by "stripping" the urethra, of a drop or two of clear albuminoid liquid, slightly tenacious, and resembling that resulting from a prostatorrhœa, with which, indeed, it is often associated. There is no subjective symptom except a sensation of dampness at the extremity of the penis. This is often so marked as to lead the patient to useless examinations of the organ, or to induce the belief that a free discharge exists, but is absorbed by the dressings or by the under-clothing. Treatment of any sort, as a rule, serves only to aggravate or at least to perpetuate this condition, which, in nineteen cases out of twenty, will subside spontaneously in a few days or weeks.

CHRONIC GONORRHŒA.—In other cases, after all marked symptoms have vanished, there will yet remain a milky or rather creamy drop, which can be pressed out of the meatus whenever a few hours have elapsed after urination. This may come from any portion of the urethra, but will usually be found to proceed from the fossa navicularis or from the anterior membranous portion. By "stripping" the urethra an inch or so at a time, gradually working backward, or by the proper use of the bougie *à boule*, as will be described under the head of Treatment, a very definite idea of the exact site of the trouble may be obtained. The meatus will be found a little reddened or swollen; there will be an undue warmth or even slight scalding on urination, erections will be accompanied with a dull ache; and all these symptoms will be much increased by venereal, alcoholic, or other excesses, especially by prolonged and ungratified sexual excitement and by the free use of spirituous liquors of inferior quality. There is no interval between this condition and the last stage, or rather the previous stage, of an acute urethritis.

GLEET.—In some cases, and especially in those in which the gonorrhœa has been of long continuance or has frequently been repeated, there will occur another group of symptoms, chief among which is a "gleety" or muco-purulent discharge. In the mornings the lips of the meatus will be found glued more or less tightly together, and on separating them a drop of opalescent, whitish fluid will become apparent or may be squeezed out. The discharge may be more profuse, but usually cannot be found during the day in sufficient quantity to be made apparent at the meatus, owing to the frequent washing out of the urethra by the stream of urine. There will often be associated with this discharge a dribbling of urine at the end of micturition, an increased frequency of the latter act, and a few vague lumbar or hypogastric pains or aches—a group of symptoms which should always suggest the existence of a stricture of large calibre.

There is also a form of chronic urethral discharge dependent upon

CHRONIC FOLLICULAR PROSTATITIS, in which the chief diagnostic points are as follows: 1. Undue frequency of micturition, with pain felt in or near the end of the penis at the end of the act. 2. A feeling of weight or of fulness in the perineum and rectum, sometimes amounting to absolute pain, especially during the passage of hardened fæces. 3. Diminution in the force of the stream, associated with dribbling toward the end of the act. 4. In the great majority of such cases the volume of the prostate, as examined through the rectum, is appreciably increased, while there is often slight tenderness upon pressure. 5. The first portion of urine passed, if collected in a glass, will be found more turbid than the second portion. This aids in diagnosticating the condition under consideration from a primary cystitis. 6. The sediment in the urine will be found to consist of prostatic epithelium, muco-pus, and a few mucous shreds. These are often associated with casts of the follicles and prostatic ducts, which are sometimes deceptively like hyaline casts of renal origin. 7. There is often, but not invariably, associated with these conditions a certain amount of sexual excitability, frequent erection, and premature ejaculation during attempts at intercourse.

## Treatment of Gonorrhœa.

In determining the proper treatment for existing gonorrhœa it is necessary, in the first place, clearly to understand the character and stage of the case with which we are dealing. The classification which has been given will be found a good one for practical purposes, and nearly all cases can be assigned to one or other of the three classes—acute, subacute, and abortive.

To take them up seriatim, we may suppose that a patient belonging to the first or acute inflammatory class presents himself for treatment, with the symptoms characteristic of the early stage: a red, swollen meatus, a little pain on urination, and a muco-purulent discharge. The so-called "abortive" treatment has been extremely unsatisfactory, and, as it consists in the injection of solutions which to do good must be strong enough to be irritating, it involves the risk of converting a mild, simple case or one of the abortive type into an inflammation of high grade and much severity. It is best to treat symptoms as they arise, and our first care should be to remove as far as possible all additional sources of irritation, chief among which are (1) the influence of motion, friction, and gravitation in increasing the amount of blood in the part; (2) the similar effect produced by sexual stimulus; and (3) the character of the urine, which must necessarily come in contact with the irritated surface,—this including, of course, the subject of diet.

(1) To overcome the first, rest in the recumbent position is the most

important means at our command. The patient should be told to avoid all physical exertion, to ride instead of walk, to sit instead of stand, and at such times as may be convenient to lie on his back with his hips elevated.

(2) The patient should avoid the companionship of women of any class, as under the circumstances there is apt to be exaltation of sexual impulse, which renders even the mere proximity of females more or less provocative of erection or at least of hyperæmia of the parts.

(3) In order to render the urine as bland as possible, a skim-milk diet is beyond question the best. A few farinaceous articles or a little stale bread and butter may be added, but the more nearly the diet is made to consist of skimmed milk the more likely is it that the patient will escape the severe ardor urinæ and troublesome chordee of the first week or two. Very few men, however, are so situated that they can make such sudden changes of diet without exciting unpleasant attention and criticism, and in most cases we are compelled to be content with a modification of their ordinary regimen. Instruct the patient, then, to reduce his animal food to the minimum, to avoid all highly-seasoned articles, acid fruits, pastry of all kinds, and indeed any article of food difficult of digestion, and all malt, vinous, and spirituous liquors. Apollinaris, seltzer, and soda water are permissible drinks, and may be taken in large quantities, serving then the double purpose of diluting the urine and at the same time reducing the appetite, so as to render more easy the observance of moderation in eating. Ordinary drinking-water may be taken in the same way, to the amount of three or four quarts daily, with great advantage; and to meet the same indication—the reduction of the salts contained in the urine—it is well to prescribe some alkaline hydragogue diuretic, combining with it an arterial sedative and an anodyne directed especially to the genital functions.

Instructions should next be given as to the best method of retaining such dressings as will serve to collect and absorb the discharge, and the patient should be cautioned as to the danger of conjunctival infection.

The foregoing directions all pertain to the first visit of the patient. If the case belong to the third (irritative or abortive) class, all the symptoms will subside in a few days; if to the second (subacute or catarrhal), the discharge will become more profuse, but no marked subjective symptoms will develop; if to the first (acute inflammatory), the phenomena already described will make their appearance with an intensity proportionate chiefly to the less or greater strictness with which the directions given have been observed. In the first case (irritative gonorrhœa) no further treatment is required; in the second (catarrhal gonorrhœa), we may at once begin with the use of such

injections as will be hereafter described as appropriate to the declining stage of inflammatory urethritis; but if we are dealing with a case of the acute inflammatory variety, we must continue to watch for and treat the symptoms.

**Treatment of Ardor Urinæ.**—For the relief of the ardor urinæ and tendency to frequent urination diuretic mixtures containing bromide of potassium and small doses of aconite and belladonna are very useful. In addition the patient may be instructed to immerse the penis in hot water during each urination: the relief which this often gives is probably due to the equalization of the blood-supply caused by it, the temporary distension of the superficial vessels relieving, to a certain extent, the congested and swollen mucous membrane.

**Treatment of Chordee.**—In the treatment of chordee attention must be paid to the following points: Before going to bed the bowels should invariably be evacuated. The bed-room must be cool and well ventilated, the mattress hard, and the bed-clothing light. No late meals should be taken, and any tendency of the thoughts toward sexual matters should be resolutely combated. The medicinal treatment of chordee has embraced a great variety of remedies, of which none is at the present time generally recognized as of pre-eminent value. Opium in the form of suppositories, used at bed-time, is very efficacious, but not without its disadvantages, the constipation induced by it being prejudicial. It may be necessary to employ it, however, in which case the following formula may be used:

℞. Pulv. opii, gr. vj;
Pulv. camphoræ, gr. xviij;
Olei theobromæ, q. s.
M. et ft. suppositoria No. vj.
Sig. Use one at bed-time.

Camphor may be given internally in doses of a fluidrachm of the tincture, or in the form of the monobromide in from 3- to 5-grain doses. Lupulin in 15- to 20-grain doses, and gelsemium in the dose of 10 minims of the fluid extract, repeated every time the patient wakes with chordee, have in my experience been extremely useful. None of these drugs are, however, so certain in their effects as is bromide of potassium. Its employment as an alkali, as an arterial sedative, and as an anaphrodisiac is especially indicated in the early stages of gonorrhœa, and should never be neglected, even when the symptom of chordee is absent. When that complication exists, the dose of bromide should be increased until decided drowsiness is produced, and it should be given at intervals during the day, with a double dose, combined with 10 or 15 drops of tincture of belladonna, at bed-time, and

repeated if the patient awakes during the night with chordee. Under this treatment, pushed vigorously, the patient will rarely have any erections, painful or otherwise. If, however, in spite of it, the chordee is persistent and very painful, resort may be had to the free abstraction of blood from the perineum by means of leeches. From a healthy adult 8 or 10 ounces should be taken, and for the next day or two he should occupy a strictly recumbent position with the hips elevated.

**Urethral Injections in the Early Stage.**—When the surgeon has decided to begin the use of injections, he should order for the patient a blunt-pointed, hard-rubber urethral syringe large enough to hold three fluiddrachms. At this stage the disease, although often extending a few inches backward, has reached its greatest intensity at or near the fossa navicularis, a point easily reached by the nozzle of an ordinary syringe, which acts as a mechanical irritant and frequently serves to increase or perpetuate the inflammatory action. Having procured his syringe, the patient should be taught how to use it, and, although it gives a little more trouble, it is always well personally to inspect this procedure at least once. In using the injection the patient should sit upon the edge of a hard chair, the buttocks slightly over it, the feet separated and the thighs relaxed. In this way all pressure or tension upon the perineal muscles is removed, and the injected fluid finds its way backward to a sufficient depth. In anterior urethritis—*i. e.* urethritis in front of the triangular ligament—the patient may sit upright, upon a handkerchief or towel rolled up and placed just back of the scrotum, thus occluding the urethra at that point. About two fluiddrachms of the injection should then be deposited within the urethra, and should be held there for two or three minutes before it is allowed to escape. This may be done with advantage after each urination. It may be laid down as a general rule that any injection which gives rise to more pain than might be described as a very slight smarting is likely to do harm rather than good, and should be diluted or withdrawn.

In selecting the drugs to be used by injection and by the mouth in the treatment of the form of urethritis we are describing—viz. recent anterior inflammatory urethritis—our description of its etiology should not be lost sight of. As this form of gonorrhœa is often an instance of mixed infection, the treatment should be more or less vigorously antiseptic.

The application of the principle of antisepsis to the treatment of urethritis may be made for one of two reasons and in one of two ways. The drugs employed may be given on account of their supposed action either upon the microbes or suppuration or upon the alleged specific microbe of gonorrhœa—the gonococcus of Neisser. They may be used locally or may be administered by the mouth. It is not necessary to

believe in an invariable and essential relation between the gonococcus and gonorrhœa to see a clear indication for the use of such agents. The successful treatment of suppuration anywhere demands their employment, though it must be admitted that when the pus is furnished by a mucous surface the difficulties of treatment—*i. e.* of successful antisepsis—are greater than under most other circumstances; and it must likewise be admitted that those difficulties are much increased when the suppurative process is established in a canal like the male urethra, the anatomical peculiarities of which favor so markedly microbic growth or multiplication. The results of culture-experiments and of the influence of parasiticides upon gonococci external to the body do not afford satisfactory evidence as to the effect of the same agents when applied to the germs imbedded in the depths of an inflamed urethral mucous membrane. Bumm's investigations appear to show that, at first, they multiply by preference in the papillary layer, and find their way to the surface only during the latter part of the purulent and during the subsiding (or muco-purulent) stage; and Finger uses this as a theoretical argument against the early administration of either astringents or antiseptics. It is certain that the agents which are effectual against the microbes of suppuration are not equally destructive of the gonococci: antiseptic solutions strong enough to destroy pus-cells almost immediately seemed to exert but little effect upon the gonococcus when applied to gonorrhœal secretions outside of the body.

Considering topical remedies first, and excluding a large number which have little or no claim to occupy time or attention, we may divide the remainder into three classes:

1. Those which when strong enough to exert a sufficient germicidal action are locally so irritating as to be harmful or unbearable. This class includes nitrate of silver, carbolic acid, chloride of zinc, iodine, chloral, potassium permanganate, salicylic acid, and creasote, all of which, when used in sufficient strength to sterilize the discharges, produce an amount of irritation that far outweighs any advantage to be derived from their antiseptic properties.

2. Those which are such feeble antiseptic agents that they cannot be depended upon to destroy all the bacteria found in urethral discharges. Among these may be mentioned resorcin, thallin, quinine, the sulphate and acetate of zinc, lanolin, sulphur waters, tannin, alum, hydronaphthol, and cadmium sulphate. The clinical and the experimental evidence coincide as to most of these drugs. Each has had its more or less enthusiastic advocates, but when given a wider trial has been found disappointing, while bacteriologists have shown that the germicidal action was either limited to a very few varieties of bacteria or was slow and uncertain.

3. The third class includes a number of agents which, while open to the same objections of too feeble or too limited antiseptic action, have the additional drawbacks of insolubility in ordinary media, and of occasionally becoming mechanically irritating from the formation of concretions. Among these are iodoform, calomel, bismuth subnitrate, oxide of zinc, and other insoluble powders.

It is not to be supposed that this list is intended to be even approximately complete. It might be increased literally a hundred-fold, and nothing could better demonstrate the folly of empirical therapeutics than the dozens of ridiculous formulæ and the hundreds of useless drugs which have from time to time been recommended for use in the various forms of urethritis. So far, however, as they are antiseptics they should be found in one or the other of the foregoing classes.

There are certain agents which I have purposely omitted from this enumeration of antiseptics, as they seem better than any others to possess the desirable quality of sufficient antiseptic strength in solution or powder weak enough to be unirritating. They are corrosive sublimate, the sulphocarbolate of zinc, boric acid, peroxide of hydrogen, and the salicylate of bismuth, and are of much practical value in attempting by topical treatment to secure asepsis in an inflamed urethra.

They may be used in different proportions, and either singly or in combination. A useful prescription is as follows:

℞. Hydrarg. chlorid. corrosivi, gr. $\frac{1}{6}$;
Zinci sulphocarbolat., ʒss;
Acidi borici, ʒij;
Liq. hydrogen. peroxid., f ʒvj.—M.
Sig. Use locally; dilute if painful.

To this may be added from 18 to 24 grains of the aqueous extract of opium if the urethra is especially irritable.

The "blennorrhagics"—of which cubebs and copaiba are the chief—may be used very early in all cases expect those of marked inflammatory type. The beneficial action of these drugs, as well as that of their congeners, gurjun, sandal-wood, kava-kava, eucalyptus, and the various terebinthinates, is chiefly due to their antiseptic powers, which deprive the partially sterilized urine containing them of many of its harmful properties, and cause it to exert a beneficial effect upon the suppurating mucous membrane. They may with marked benefit be combined with salol, which, by its decomposition into salicylic and carbolic acids, to be excreted through the kidneys, aids powerfully in rendering the urine not only aseptic, but also antiseptic.

A capsule containing salol 5 grains, oleoresin of cubebs 5 grains,

Para balsam of copaiba 10 grains, pepsin 1 grain, is often useful, four to six capsules daily being given.

In cases in which the irritation of the whole urinary tract is so great as to contraindicate the use of the cubebs or copaiba the salol may be given alone in 10-grain doses four times daily, or boric acid may be administered in some such combination as the following:

℞. Acidi borici,
Potassii bromidi, āā. ℈viij;
Tinct. aconiti, gtt. xvj;
Mist. potassii citrat., f℥viij.—M.
Sig. A table-spoonful in water every two hours.

In certain cases, in which these preparations disagree or seem to lose their effect, it will be well to substitute sandal-wood oil in doses of 10 minims four times daily.

A little later in any case an injection containing an insoluble sediment may be substituted for the antiseptic injection given above, as, for example,

℞. Bismuth. salicylat., ʒij;
Acidi borici, ʒiij;
Liq. hydrogen. peroxid., f℥vj.—M.
Sig. For local use.

Sometimes, especially in the first few days, no injection can be borne except an almost purely sedative one, and then the following may be tried:

℞. Acidi borici, ʒij;
Ext. opii, aqueous, gr. xviij;
Liq. plumbi subacet. dil., f℥vj.—M.

While using the injections containing sediments the patient will often be unable accurately to estimate the character and amount of his discharge. After a time, therefore, it is well to substitute for them a watery solution of some simple astringent, preferably the sulphocarbolate of zinc, and to combine with it, if there be any lingering sensitiveness or tenderness to scalding, morphine or dilute hydrocyanic acid, as in the following prescriptions:

℞. Morphinæ sulphat., gr. j:
Zinci sulphocarbolat., ℈j;
Aquæ rosæ, f℥iv.—M.

| | |
|---|---|
| ℞. Zinci sulphocarbolat., | ℈j ; |
| Acid. hydrocyanic. dil., | gtt. xij ; |
| Aquæ rosæ, | f℥iv.—M. |

In this, as in all other cases, if the injection proves to be painful it should be diluted; if painless and if it does not entirely control the discharge, it should be strengthened.

Now, under this treatment, in many instances, the discharge will disappear and no further symptoms manifest themselves, unless, as often occurs, treatment is prematurely discontinued. The only safe rule to follow is to instruct the patient gradually to stop the use of injections and to decrease the dose of medicines, omitting first the mid-day portions, then those of the morning, and last of all those taken just before going to bed; the whole process should extend over ten days. He should be cautioned also against frequent or vigorous "strippings" of the urethra for purposes of inspection.

### Treatment of Persistent Urethral Discharges.

If, in spite of the injections as above given, the discharge continues, recourse may be had to stronger solutions, the sensibility of the urethra being taken as an index. In this way 5 or 6 grains of zinc to the ounce will often effect a cure when weaker injections have failed; or acetate of zinc, tannin, sulphate of copper, nitrate of silver, alum, tincture of catechu, hydrastin, and various other drugs may be employed occasionally with advantage, though apt to be disappointing.

**Treatment of Urethral Catarrh.**—If the characteristics of what we have called urethral catarrh are present, a little attention to the general health will usually be sufficient, without local treatment, to terminate the case. Perseverance in the use of astringent injections will sometimes hasten the cure, but quite as often seems to retard it. These constitute the majority of those chronic urethral cases which are often reported by patients as having been cured by homœopathic treatment, the negative character of which leaves free play to that *vis medicatrix naturæ* which is really all that is required.

**Treatment of Chronic Gonorrhœa.**—In other cases, particularly when the attack is the first one, the discharge persists, creamy or yellowish in appearance, associated with a few mild subjective symptoms indicative of a localized inflammation, which proves to be easily warmed up into a state of activity; in other words, we have the condition which it is convenient to designate as chronic gonorrhœa. To determine this beyond question, a bulbous bougie, three or four sizes smaller than the normal calibre of the urethra, should be gently inserted into the bladder, and any point of unusual sensitiveness should be noted during its withdrawal. It may be assumed that such

a sensitive spot corresponds to a small patch of granular urethritis, to which appropriate remedies must be applied. For this purpose the patient should be ordered a prostatic syringe of hard rubber having a long curved nozzle with a bulbous tip. He should be instructed in what manner and to what depth to insert this instrument, and the surgeon himself should administer the first two injections. For this it is well to use about one fluidrachm of a solution of nitrate of silver, of the strength of half a grain or a grain to the fluidrachm of distilled water, or, if this does not give rise to pain on the first injection, in still stronger solution. The discharge and pain may be increased for a short time after these injections, which should then be followed by gradually strengthened solutions of sulphocarbolate of zinc carried to the exact spot in the same manner. If the discharge diminishes, but does not disappear, the same process may be repeated, and will result in permanent cure. In certain cases spasmodic contraction of some of the circular muscular fibres surrounding the urethra prevents the injection from coming in contact with the surface which is the source of the discharge. In these cases the use of full-sized sounds is imperatively indicated.

Irrigation of the urethra with various medicated liquids has been recommended, and is a useful procedure in those cases in which the foregoing treatment proves ineffectual. A moderate-sized, short, flexible rubber catheter—preferably a "Nélaton"—with large bevelled eyelets, should be inserted into the bladder, and then connected with a syringe like the ordinary "Mattson" or "Davidson" syringe. A pint or more of the solution preferred, usually one of the astringents above mentioned, may then be passed through the urethra, withdrawing the catheter, the lotion finding its way between the instrument and the walls of the urethra and making its exit at the meatus. In one or the other of these ways chronic gonorrhœa is always curable.

**Treatment of Gleet.**—If we find a patient with a true gleet, having had several previous attacks of gonorrhœa or one which has been very protracted, and with dribbling after urination, etc., we should carefully examine his urethra with a bulbous bougie, when we shall probably find the condition described as indicative of the presence of a submucous deposit or a "stricture of large calibre" or commencing stricture. The treatment will be considered under the head of Urethral Stricture.

### Treatment of Complications of Gonorrhæa.

We may now consider the treatment of the complications of gonorrhœa.

**Balanitis** usually requires for its treatment only perfect cleanliness and the use of some desiccant sedative powder, such as opium and

lycopodium (R. Pulv. opii, gr. j; lycopodii, gr. ij). Three or four times daily this should be dusted on the inflamed surface, previously washed and gently dried. Strips of dry lint inserted between the glans and foreskin, and changed whenever they become moist from the discharge, will often effect a cure.

**Balano-posthitis**, when accompanied with œdema of the prepuce, is best reduced by a lotion of lead-water and laudanum kept continuously applied. The dry dressing may be used with advantage after the swelling has subsided. Good in both the preceding conditions follows from painting the inflamed glans and the inner surface of the foreskin with a 30- or 40-grain solution of nitrate of silver.

**Phimosis** may be relieved by circumcision or by splitting open the foreskin along the dorsum, completing the operation at some later period; but both of these procedures are undesirable if it is possible to avoid them. In nearly every case lead-water and laudanum externally, with subpreputial injections of soap and water, followed first by clean water and then by lead-water and laudanum, will reduce the swelling, so that the glans may be uncovered.

**Paraphimosis**, if seen at first while the preputial swelling is œdematous and not inflammatory in its character, should be immediately reduced. The ordinary procedure, and one which usually suffices, consists in oiling the parts, locking the index fingers of the two hands above and behind the corona glandis, the middle fingers below and beneath it, and gradually compressing the glans itself with the thumbs, emptying its congested vessels, and finally forcing it backward while the fingers bring forward the swollen foreskin. Or the body of the penis may be encircled with the thumb and index finger of one hand, while with the other the glans is gradually compressed and pushed into the preputial orifice. It must be remembered that not only the glans, but also a ring of swollen mucous membrane, is to be returned through the orifice.

When the paraphimosis has been of longer duration and an effusion of plastic lymph is present, more permanent compression may be required, and in that case the glans and foreskin should be "strapped" with pieces of adhesive plaster; in twenty-four hours reduction usually becomes possible. If not, the dressing should be removed.

If all these means fail, we may divide the constriction on the dorsum of the penis by inserting beneath the prepuce a flattened sharp-pointed bistoury, and then turning its edge and cutting upward; or the stricture may be cut down upon from without inward, always remembering to look for it in the furrow which divides the mucous membrane from the integument, the first one behind the furrow of the cervix glandis.

**Follicular abscess** often opens spontaneously into the urethra and

requires no surgical interference. When the skin becomes thinned and discolored over such swelling it is well to incise it freely.

**Peri-urethral abscess** should be evacuated more promptly, as soon, indeed, as suppuration is established, as a spontaneous opening in these cases may be followed by urinary extravasation. In their earliest stages these abscesses may sometimes be aborted by the use of sedative lotions, with absolute rest in bed, moderate elevation of the organ, and free purgation.

**Lymphangeitis** rarely requires any special treatment. Evaporating and sedative lotions and rest will usually relieve any pain which may be associated with it.

**Bubo** may sometimes be aborted by the use of pressure or iodine, or, if these fail, may be poulticed and opened as in any case of glandular suppuration. It is never a serious affection.

**Cowperitis** requires rest, elevation of the buttocks, leeches to the perineum, hot sitz-baths, poultices, and prompt evacuation if suppuration occur.

**Prostatitis, Prostato-cystitis,** and **Cystitis** must all be treated in very much the same manner. Upon the first development of the early symptoms—frequent urination, vesical tenesmus, etc.—the patient should be placed at absolute rest in the recumbent position, with the hips elevated upon a hair pillow; his diet for a few days should be limited to skimmed milk; an alkaline diuretic mixture should be administered; enemata of hot water containing a few drops of laudanum should be given frequently; finally opium, combined with belladonna or hyoscyamus in suppositories, should be used at bed-time and at intervals during the night if the calls to urinate are frequent. Bromide of lithium in 5-grain doses every three hours, or citrate of caffeine in 3-grain doses, may be added to the diuretic mixture if the urine remain scanty and high-colored.

All urethral injections should immediately be stopped, and the patient should be instructed to resist as long as possible the desire to urinate, and also the inclination to strain and bear down at the end of the act.

**Retention of Urine.**—If retention of urine should occur as an additional complication, place over the hypogastrium a large, mushy, hot hop poultice covered with oiled silk, and renew every two hours; give an enema of hot water and soapsuds.

If the symptoms of retention and of distension of the bladder become serious, the urine should be drawn away with a Nélaton's catheter, using the greatest possible tenderness in its insertion. It must be understood that the evils of the gentle introduction of a soft catheter, even as often as twice or thrice daily, are less than those produced by the intense and almost continuous tenesmus, which increases

as pelvic congestion augments the prostatic and vesical inflammation, and causes almost unbearable suffering. Of course if a tight stricture were present, and there should be difficulty in introducing a soft instrument, others should be tried, and occasionally external urethrotomy or perineal section may become necessary.

**Prostatic Abscess.**—During an attack of acute prostatitis suppuration may occur in the gland. If the abscess opens into the urethra, as it usually does, no special treatment is necessary; if it points toward the rectum, however, or if, with unmistakable symptoms of suppuration, the abscess shows no disposition to point in either of these directions, it becomes necessary to evacuate it through the perineum. An incision should be made in the median line until the pus-cavity is reached.

**Chronic Prostatitis.**—When prostatitis becomes chronic the treatment is difficult and prolonged. It may be summarized as follows: removal of stricture, contracted meatus, phimosis, or other predisposing cause; restricted diet; avoidance of all liquors, except some form of light red wine; careful attention to the bowels, cold-water enemata once a day being often of great service; daily cool hip-baths, of a temperature and duration governed by the sensations of the patient, and persisted in as long as they are followed by relief of subjective symptoms; counter-irritation to the perineum, preferably by iodine; normal exercise of the genital functions. Cauterization of the prostatic urethra is unquestionably useful in many cases, but should be employed only after these other measures have failed. A few drops of a 30- or 40-grain solution of nitrate of silver should be deposited in the prostatic urethra, and the immediate effect, which is a more or less marked inflammatory action, watched and controlled by rest and appropriate remedies. The operation may be repeated if no benefit result from the first application.

In the form of urethral discharge dependent upon chronic follicular prostatitis, attention to the following rules of treatment will give the most satisfactory results in a large proportion of cases:

Limited diet, especially as regards nitrogenous articles of food; abstinence from sexual excitement, particularly if ungratified; great attention to the condition of the rectum, which should never be allowed to contain even for a few hours a mass of hardened inspissated fæces. To avoid this, white gluten suppositories used at bed-time are most satisfactory. There should be a free application of a mixture of tincture of iodine and tincture of belladonna to the perineum, repeated night and morning until the skin becomes exceedingly tender, and resuming it at once when the tenderness passes away. This is better than the actual blisters recommended by Sir Henry Thompson and others, on account of the long-continued irritation which can be kept

up in this manner. Careful attention should be paid to the condition of the urine. As a routine treatment a mixture of bromide and citrate of potassium, with small doses of aconite, belladonna, and ergot, will be found useful.

The application of cold, especially in the form of a jet or stream of water, as by the persistent and thorough use of the bidet, is of the greatest benefit. The patient should use it for ten or fifteen minutes at least twice daily—once after his usual evacuation of the bowels, and once before going to bed. It is well at both these times to wash out the rectum with tepid or warm water, and to employ the cold jet directed against the perineum.

**Epididymitis** at its onset should be treated as follows: Put the patient to bed in the recumbent position; elevate the scrotum above the level of the thighs; apply directly over the painful testicle a piece of patent lint soaked in the following lotion, with which it should be kept continuously wet:

| | | |
|---|---|---|
| ℞. | Tinct. aconiti, | f℥ss; |
| | Tinct. opii, | f℥jss; |
| | Liq. plumbi subacetat., | |
| | Aquæ, | āā. f℥iij.—M. |

Administer a saline laxative, restrict the diet, stop all urethral treatment, and give a drop of tincture of aconite and 5 grains of bromide of potassium every two hours. Usually the symptoms will subside in two or three days, and the patient may be permitted to walk around, keeping the testicle still enveloped in the lotion and well supported by a suspensory. When the swelling, either in spite of treatment or in its absence, has progressed to a considerable extent and the testicle presents a large solid mass, the pain having become dull and aching and only severe upon motion or in walking, great relief may be obtained by the application of compression by means of strapping with adhesive plaster. Later on an ointment of belladonna and iodoform may be applied upon a piece of lint worn beneath a suspensory.

The induration of the epididymis which remains after all inflammatory action has disappeared is usually permanent, and is not much affected by treatment. It may, however, diminish under the use of belladonna and mercurial ointment and the internal administration of iodine and a mercurial. In cases of double epididymitis followed by sterility it is well to pursue this method of treatment for a long period, as the re-establishment of the spermatic canal to ever so slight a degree is then, of course, a matter of great importance.

**Gonorrhœal Rheumatism** has always been a peculiarly obstinate and intractable form of joint-trouble, and treatment is unsatisfactory

on account of the persistence of the swelling and inflammation. On the occurrence of joint-symptoms place the patient immediately at rest and limit the movements of the diseased articulation, which should first be freely painted with iodine or enveloped in lint covered with the ointment of belladonna, mercury, and iodine in equal proportions, then in a layer of cotton wadding, and finally confined by means of a splint. Purge briskly; place the patient at once upon full doses of quinine and small doses of some mercurial. A hypodermic injection of $\frac{1}{4}$ grain of morphine may be given at bed-time. The splint should be removed daily, and after the first three or four days gentle motion should be made in the joint, especially if it be the wrist. The diet should be generous, and great attention should be paid to the condition of the digestive tract. Urethral treatment, if mild in character and not involving instrumental interference, may go on uninterruptedly. The disappearance of the swelling may be hastened by "strapping" the joint with adhesive plaster, something after the fashion of its use in epididymitis. This should not be done, however, until after the acute symptoms have subsided.

**Gonorrhœal Ophthalmia** is so closely allied to the preceding affection, and is so often associated with it, that it seems evident that the same general treatment would be likely to prove beneficial. In conjunction with the treatment by quinine and mercury, it would be proper in these cases to use warm collyria, to apply blisters or leeches to the temple, to keep the pupils dilated with atropine, and to employ warm foot-baths, laxatives, sinapisms, and other revulsive measures.

**Conjunctivitis**, as a complication of gonorrhœa, is of so serious a nature, and the prognosis, even in the most favorable cases, is so grave, that it is customary and advisable to call in the services of an ophthalmologist to share the responsibility. The general plan of treatment consists in placing the patient in a darkened room; hermetically sealing the sound eye to prevent infection; relieving tension, when the chemosis is great, by free scarification of the conjunctiva; cauterization with the nitrate of silver; canthoplasty, to permit the free escape of discharges; leeches to the temple; atropine; puncture of the anterior chamber when there is much increase of intraocular pressure; perfect cleanliness; and a general revulsive and antiphlogistic treatment.

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## GONORRHŒA IN THE FEMALE.

Gonorrhœal inflammation in the female may develop in the vulva, vagina, urethra, or uterus, which are involved with a frequency

indicated by the order of mention. It may extend to the Fallopian tubes or even to the ovaries.

Vulvitis is characterized by the ordinary signs of acute inflammation. The labia are red, abraded, and excoriated, and the nymphæ sometimes swollen so as to occlude almost completely the entrance to the vagina. The parts are sensitive to pressure and painful upon motion. The passage of the urine across the inflamed surfaces gives rise to an intense burning, which may be mistaken for the ardor urinæ of urethritis, and is often quite as severe.

The inguinal glands are apt to be enlarged and tender, and sometimes suppurate. In some cases inflammation follows the ducts of Bartholin's glands and excites suppuration or abscess in these bodies, producing vulvo-vaginal abscess.

Vaginitis, following purulent infection, usually begins at the lower and posterior aspect of the canal. It is at first attended with a feeling of weight and fulness. A mucoid discharge soon appears, and rapidly becomes purulent. The subjective symptoms, although not often so severe as in vulvitis, are occasionally very marked, and, as in vulvitis, are those of ordinary inflammation. Ulceration of the vagina sometimes occurs when the disease assumes a very obstinate and rebellious form.

In the *chronic* variety of vaginitis the presence of the discharge, thickening of the vaginal mucous membrane, and enlargement of its papillæ are almost the only symptoms to be met with.

Urethritis in the female is attended with few symptoms as compared with the same disease in the male. It is unquestionably due in a majority of cases to extension of inflammation from the vulva or vagina, but it is unsafe to assume that any woman with a urethritis has necessarily acquired it by contagion and as a result of exposure to the discharge resulting from a similar inflammation in a person of the opposite sex. It may be admitted, however, that the existence of a urethritis in a female is presumptive evidence of impure connection, particularly in those cases in which it exists independently of any vulvar or vaginal affection. When these regions are involved the question of original causation reverts to them.

The shortness of the female urethra, its downward inclination from the neck of the bladder to the meatus, and the comparatively small amount of mucous membrane involved prevent at the same time the formation of any large amount of discharge and the development of any extremely painful symptoms. Ardor urinæ and vesical irritability exist in nearly all cases, but are of only moderate severity.

### Treatment of Gonorrhœa in the Female.

**Vulvitis.**—Perfect cleanliness and dryness of the parts are essentials of success in treatment. The labia should be washed every two

hours with a strong solution of bicarbonate of sodium to dissolve and remove all accumulated serum and mucus. In using this the labia should be gently separated with the thumb and fingers of one hand, while with the other a stream of the alkaline solution is squeezed out of a sponge held a short distance above. After this operation is completed a soft old linen rag should be held in contact with the vulva until all the fluid is absorbed; the parts should be dusted with a fine powder of starch, boric acid, and oxide of zinc or of opium and lycopodium; a piece of patent lint should be carefully interposed between the labia; and absolute quiet should be preserved until it is time to repeat the dressing. In certain very inflammatory cases these measures do not suffice. It will then be necessary to purge, to employ prolonged hot baths—not sitz-baths—to follow them with a lotion of opium and lead-water kept continually on the inflamed region, or to paint the entire vulva with a 40-grain solution of nitrate of silver.

The diet should be restricted, consisting chiefly of milk and farinaceous articles.

When it becomes apparent that a vulvo-vaginal gland is involved, timely local bleeding may arrest the inflammation, but if it fail to do so suppuration may be hastened by warm fomentations; the incision should be made on the inner and lower aspect of the swelling, as it is possible to obtain the best drainage in that manner. In chronic, frequently-recurring abscesses of this region, instead of dissecting out the capsule of the gland, as has been recommended, or of putting in a seton, it will be sufficient to lay open the cavity by a free incision, and to pack the wound, after curetting, with iodoform gauze.

**Vaginitis** requires the same management as vulvitis, though the confinement to bed is hardly so imperatively necessary. The routine treatment should be as follows:

The patient, being in bed with the buttocks resting upon a hair pillow or a folded sheet, should be instructed to wash out the vagina every two hours with an injection of a pint or two of soap and water, or, if that prove irritating, with an alkaline solution—to follow this with a pint of simple water, and to conclude with the use of a pint of some medicated solution, preferably during the acute stage one of acetate of lead.

The materials used as injections are various, but belong chiefly to the classes of astringents and antiseptics. In the majority of cases it will be found best to use at first the acetate of lead and to follow this, as the pain subsides and the inflammation becomes less acute, with alum or the acetate or sulphate of zinc, or with sublimate solution 1 : 10,000 or 1 : 20,000, or with peroxide of hydrogen in combination with sulphocarbolate of zinc, and when under this treatment the pain has entirely disappeared and the discharge has become watery, to pack

the vagina with tannin or to use suppositories according to circumstances. In prescribing vaginal injections for women it is always well to order the material in powder, telling the patient how much to dissolve in a given quantity of water. For use in a pint of water, for instance, she should employ of

| | | |
|---|---|---|
| Acetate of lead, | 1 tea-spoonful | = 3 drachms; |
| Acetate of zinc, | 2 tea-spoonfuls | = 3 drachms; |
| Sulphate of zinc, | 1 tea-spoonful | = 2 drachms; |
| Alum, | 1 tea-spoonful | = 2 drachms; |
| Tannin, | 4 tea-spoonfuls | = 2 drachms. |

These should be diluted when it is found that they occasion pain. If the patient be in good circumstances, the subsiding stage of a vaginitis will be best treated with vaginal suppositories, which may be used thrice daily, the supine position being observed for at least an hour after the introduction of each one. As examples of useful formulæ the following may be given:

| | | |
|---|---|---|
| ℞. Ext. opii, | | gr. iij; |
| Acidi tannici, | | ʒj; |
| Ol. theobromæ, | | q. s. |
| M. et ft. suppositoria No. xij. | | |

| | | |
|---|---|---|
| ℞. Pulv. alum., | | |
| Cerat. plumbi subacet., | *āā.* | ℈iij; |
| Ol. theobromæ, | | q. s. |
| M. et ft. suppositoria No. xij. | | |

At night, in all cases of vaginitis, it will be found convenient to employ little pledgets of absorbent cotton into which some medicated powder has been rubbed. The patient should keep, on a chair or table beside the bed, two or three of these little rolls, and on waking during the night should insert one as far as the finger will carry it, first, of course, withdrawing the previous one. Lead, zinc, and tannin may be used in this way, the former usually with the greatest advantage.

**Urethritis** in females, as a rule, runs its course very rapidly and requires but little attention. Injections may be used by the surgeon, their strength being carefully adapted to the sensibility of the mucous membrane, and the great probability of their entering the bladder being remembered. The same principles of treatment hold good and the same solutions are useful as in urethritis in the male. Copaiba, cubebs, and sandal-wood oil, salol, and boric acid, may also be administered with advantage, acting as usual through the urine.

## URETHRAL STRICTURE.

THE most important disease of the male urethra is stricture, which in its lesser degrees so often comes under the notice of the general practitioner that some consideration of it here seems desirable, though its therapeutics are, as a rule, of the operative kind.

*Stricture* is an abnormal lessening of the calibre or the dilatability of the urethral canal, associated with changes in the mucous, muscular, or submucous structures constituting its walls. This definition includes the following chief varieties of stricture: (1) *Inflammatory;* (2) *Spasmodic;* (3) *Organic.*

*Inflammatory stricture* is produced by swelling of the mucous membrane, causing great diminution in the size of the stream of urine, from the unnatural approximation of the urethral walls. The condition is almost always of short duration. The treatment is that appropriate to the form of urethritis in question.

*Spasmodic stricture* depends on a contraction of the muscular fibres surrounding the urethra, either the unstriped or the compressor urethræ, and is always due to some irritative cause, direct or reflex, often aided by such predisposing causes as the uric-acid or oxalic-acid diathesis, sexual plethora or excess, etc. The immediate treatment consists in the use of a warm bath, the administration of morphine or atropine, preferably by the rectum or hypodermically, the use of diluent drinks, and, of course, the removal of the exciting cause if it can be discovered.

*Organic stricture* is always the result of some antecedent injury or disease, usually a previous urethritis. It is especially apt to follow those cases in which the urethral inflammation has run a very protracted course. The pathological condition varies from an induration of the mucous membrane to the formation of a mass of cicatricial tissue occupying the submucous region. The strictured portion of the urethra varies greatly in extent, from a mere cord-like band, the so-called linear stricture, to one slightly broader.

The majority of strictures are to be found in the bulbo-membranous region, which includes a space from about one inch in front of the anterior layer of the triangular ligament to the prostato-membranous junction. The next most frequent seat is in the first two and a half inches of the urethra, and the smallest number are found in the middle of the spongy urethra. These remarks apply to the forms of stricture produced by urethritis. Traumatic stricture usually affects the membranous urethra.

Strictures are further divided into *irritable,* when they are readily inflamed and bleed easily upon the touch of an instrument, and *resilient,* when they are elastic and contractile, returning with great rapidity to their former size after being dilated. They are also divided into those

of *small calibre*, which may be arbitrarily assumed to include strictures which will only admit instruments less in circumference than 15 millimetres, and those of *large calibre*, or strictures which will take instruments from that size upward.

The idea that any particular fixed calibre represents the normal condition of the urethra has long ago been abandoned, the observed variations of that canal being such that no special dimensions can be assigned to it as representing the precise dividing-line between health and disease. The size of the penis, too, furnishes a general indication of the urethral dimensions, but one which is approximate merely. On the other hand, there are usually certain normal variations even in the spongy portion, and it is impossible always to distinguish between these irregularities and coarctations of equal calibre due to incipient stricture.

The most valuable *urethral instruments* for the purpose of diagnosis are the flexible gum bougies *á boule*. The shoulder of the acorn-shaped bulb should join the shaft at almost a right angle. The size selected for exploration should be determined approximately by noting the circumference of the flaccid penis.

A penis three inches in circumference at the middle of the spongy portion indicates a urethra which should normally admit an instrument of about 26 to 28 millimetres in size; when it is $3\frac{1}{4}$ inches, the urethra should have a calibre of from 28 to 30 mm.; $3\frac{1}{2}$ inches, 30 to 32 mm.; $3\frac{3}{4}$ inches, 32 to 34 mm.; 4 inches, 34 to 36 mm.; beyond which size it is seldom necessary to go.

If the meatus be too small to admit of the introduction of a bulbous bougie of the required size, it should be enlarged. The penis should then be grasped just behind the corona and held gently between the thumb and finger of the left hand, the foreskin, if redundant, having been retracted. The dorsum of the penis should face the abdominal wall. The bougie, well oiled, should then be passed gently into the bladder. If arrested, the point on the shaft corresponding to the meatus should be marked, the distance from that to the bulb representing the position of the anterior face of the stricture. If that instrument or a smaller size passes through, it should then, after a moment's delay, be withdrawn, and if during its outward passage any contraction is found other than that at the triangular ligament (which has been shown to be normal), it is probably due to stricture, though spasm, which often relaxes after a few seconds or shifts its position in the canal as measured from the meatus, may give rise to errors in diagnosis. It cannot always with certainty be recognized.

By this plan the probability of mistaking physiological narrowing for stricture is greatly diminished, and cases which present definite symptoms, such as gleety discharge, frequent urination, dribbling at

the end of micturition, etc., and in which such an examination discloses a distinct contraction, may with propriety be considered as cases of organic stricture.

## Treatment of Organic Stricture.

We may now consider the treatment appropriate to the different varieties of organic stricture.

*Strictures of large calibre—that is, of more than No. 15 French scale—situated at or behind the bulbo-membranous junction.*

The stricture having been located and measured by the bulbous bougie in the manner above described, a conical steel sound, a few sizes larger than the bulb which has passed the stricture, should be sterilized by heat or by a carbolic lotion, or at least thoroughly polished by friction with a clean towel, and after having been warmed to the temperature of the body and oiled with 1 : 40 carbolized oil, should be carefully introduced through the stricture.

If the instrument is employed with ordinary care and gentleness and has been properly sterilized, and if in passing it through the deep urethra the fingers of the left hand of the surgeon are used as a fulcrum in the perineum, and the long end of the lever is depressed with slowness while the conical point representing the short end is made to follow accurately the subpubic curve of the urethra, the production of prostatitis, epididymitis, or urethral fever, the three most common complications of rough or clumsy instrumentation, will follow only with extreme rarity. In the majority of cases these complications are due to the use of force in the introduction of the sound (when it practically becomes a divulsor and is very objectionable) or to a slovenly disregard of antiseptic details.

The use of an instrument in this manner is always followed by a slight and transitory hyperæmia of the region about the stricture, during which period in many cases, particularly recent ones, appreciable softening and absorption of stricture tissue occur. This period lasts for from three to four days, and only when it begins to subside should the instrument be reintroduced. Ordinarily, an advance of one or two numbers of the French scale may be made each time, but occasionally the same instrument must be used at several sittings before it can be exchanged for a larger one. This should be determined by the degree of resistance experienced during its introduction, the pain which it excites at the time and subsequently, and the presence or absence of bleeding. Personal experience soon becomes the best and safest guide as to the degree to which dilatation may be carried at any particular sitting. The feelings of the patient should always be consulted. When the full size has been reached (following the table already given as an approximate guide), the symptoms will usually disappear, and after

this it is only necessary to carry on the dilatation at longer and longer intervals to maintain the cure. Most surgeons whose patients are of average intelligence have no difficulty in teaching them to use such an instrument for themselves, and the great majority of my patients do so without the least discomfort or inconvenience. A certain proportion of cases under this plan of treatment will get entirely well, so that years afterward no trace of stricture can be discovered. Others, if the intervals between the introduction of the sound are too long, will have slight recontraction, evidenced possibly by a recurrent gleet; but the rule is that with ordinary care a practical cure is attained by this method in the great majority of cases. Its advantages are obvious, and have for many years held for it the first place in the estimation of those surgeons whose aim is to effect a cure, or at least cause the disappearance of all symptoms, while they at the same time minimize the danger and inconvenience to the patient, who even in those cases in which an entire cure is not brought about remains by this method master of the situation.

In contrast to this we have presented the claims of internal urethrotomy, the merits of which are somewhat extravagantly vaunted by its advocates, while its undoubted dangers are sometimes ignored. I do not by this mean so much the danger to life itself, although that exists in a definite percentage of cases, but refer rather to the curvation of the penis, the excessive hæmorrhage, the defective expulsive power, causing dribbing after urination, etc., which not infrequently follow extensive urethrotomy.

It must be remembered that no special advantage is claimed for this operation unless it is extensive. I am justified in saying that as applied to the class of strictures under consideration (those of the deep urethra) the operation is not believed by the profession nor by the great majority of those having special experience in genito-urinary disease to be either safe or curative.

*Strictures of large calibre occupying the pendulous urethra.*

In this region all the risks of cutting operations are much reduced, and, if scrupulous attention to antiseptic details be observed, need scarcely be considered. The probability of permanent cure seems also to be correspondingly increased. The existence of strictures in the locality under consideration may be determined in the usual way. As to treatment, internal urethrotomy is to be preferred when such a stricture is of long standing, distinctly fibrous in character, or non-dilatable. Resiliency or resistance to dilatation is indeed the chief indication for a cutting operation on strictures at any point of the urethral tract, and is far more important in determining the choice of treatment than their calibre; but internal urethrotomy in the pendulous urethra is particularly satisfactory on account of the

comparative freedom from danger which has already been alluded to. As to the probability of effecting thereby a permanent cure, while it is much greater here than elsewhere, such a cure can only be expected in a limited proportion of cases. It is not in accord with other pathological observations to suppose that the mere division of a dense and old contractile band of fibrous tissue will result in its absorption. My belief is that the majority of the true strictures of the spongy urethra which are cured by internal urethrotomy are those in which the division of the stricture is supplemented by the use for some time of full-sized bougies. The relief of tension afforded by the section of the strictures gives full play to the so-called "inflammatory atrophic dilatation," and in a certain proportion of cases either retrograde metamorphosis and absorption take place, or at least a thinning and weakening of the fibrous band, which results in its practical disappearance as a cause of obstruction. It is probable, however, on both clinical and pathological grounds, that the great majority of so-called strictures of the pendulous urethra which are cut by the extremists in urethrotomy are points of physiological narrowing. The so-called "cures" may be illustrations of the alleged fact that by a linear incision into its long axis it is possible to put in the normal urethra a longitudinal splice of fairly healthy tissue which has but little tendency to contract afterward, and thus to enlarge the urethral calibre more or less permanently, but this possibility has not yet been conclusively demonstrated.

The proportion of cases in which true strictures of large calibre in the pendulous urethra require internal urethrotomy varies largely with the character of the patients among whom the surgeon practises. Hospital and dispensary patients on account of their previous neglect of the stricture, require urethrotomy in a much larger percentage of cases than private patients of good social position. Among the latter perhaps not more than one in eight or ten needs such operative measures, gradual dilatation, as above described, amply sufficing in the remainder to cause the disappearance of all symptoms, and often of the stricture itself when it is of recent formation.

*Strictures of the meatus and of the neighborhood of the fossa navicularis.*

In this region dilatation is peculiarly unsatisfactory. Owing to the intimate relations between the spongy tissue of the glans and the urethra, to the exceptionally rich nerve-supply to the part, and to the extreme sensibility characteristic of muco-cutaneous outlets, stretching of the stricture by means of sounds gives rise to pain, irritation, and inflammation. For these reasons and on account of the absolute safety of the procedure it is better to divide all such strictures rather than to attempt to dilate them. But while the cutting of true strictures in the

anterior urethra is proper, the division of every point at the meatus and in the first few inches, simply because these points are (as they should be normally) narrower than other points in the canal, is routine surgery and most undesirable.

The operation of meatotomy is best done with a probe-pointed tenotome with the usual convex cutting edge. The incision should be made upon the floor of the urethra, and should be sufficient entirely to remove all sense of resistance upon the withdrawal of a full-sized bougie *à boule*. It should be a little larger than the calibre which it is desired to establish permanently, so as to allow for subsequent contraction. Like all other operations upon the urethra, it should be done with scrupulous attention to antiseptic details. A short, straight, conical bougie, the so-called meatus sound, should be gently inserted once in twenty-four hours during the healing process. Deeper troubles, unless urgent in their character, should be ignored until healing is complete. Sometimes, but much more rarely than is generally supposed, such troubles, although previously thought to be organic, will be found to have disappeared. In those cases they have probably been due to reflex irritation, but this condition never occurs except in conjunction with a pin-hole meatus or with a distinctly strictured condition of the urethra in its vicinity. The production of deep urethral spasm as a result of the so-called anterior stricture of large calibre, either at the meatus or elsewhere, is open to grave doubt.

*Strictures of small calibre (less than No. 15 French scale), situated in advance of the bulbo-membranous junction.*

Strictures of this calibre in this region, unless seen very early and found to be unusually soft and dilatable, furnish the typical condition for internal urethrotomy—that in which it is attended with the minimum of danger and with the greatest prospect of effecting a permanent cure. The operation may be performed with the instrument which the surgeon happens to prefer, the essentials to success being a linear division in the roof of the urethra of every portion of strictured tissue, the incision extending from the normal parts behind to the normal parts in front of the stricture.

The moderate risk attending this operation is reduced to its smallest proportion by the employment of sterilized instruments, the use of urethral irrigation before (and, if necessary, after) the operation, the administration of internal remedies which tend to sterilize the urine, and by attention to the various details of antisepsis as applied to genito-urinary surgery. (See p. 599, Vol. I.)

A few days after the operation a full-sized bougie should be gently passed, and should be used afterward, as in cases of dilatation, for some weeks. Often it will be necessary to use it at intervals for a much longer period. In a fair proportion of cases an apparent cure follows.

*Strictures of small calibre (less than No. 15 French scale), situated at or deeper than the bulbo-membranous junction.*

The diagnosis of these strictures, which are surgically most important, can be made either by means of a bulbous bougie, if it is possible to pass one through them, or by introducing a sterilized sound, well armed and oiled, down to the anterior face of the contraction. They will usually be accompanied by gleet and marked vesical symptoms, increasing in severity with the tightness of the stricture. The choice of treatment lies between dilatation and some forms of urethrotomy. Divulsion is so clumsy, so uncertain, and so dangerous as to have to-day almost no advocates.

In beginning the treatment of such a stricture as we are considering we should attempt first, with great gentleness, to pass through it a steel sound, provided its introduction requires no force whatever. Below eight or ten of the French scale we should not go in the use of metal instruments, as in the most skilful and experienced hands there is distinct and unavoidable danger of laceration of the inflamed and degenerated mucous membrane around the strictured region. If a sound of whatever size is passed through the stricture, it should be allowed to remain for from five to ten minutes, and then withdrawn. If it is the first experience with the patient, it is best to avoid further instrumention for from twenty-four to seventy-two hours, in the mean time administering 5-grain doses of salol or boric acid four times daily, with a full dose of quinine night and morning. At the next sitting it is often well to begin again with the same instrument, after which one, two, or three larger sizes may be used in succession if their introduction is easy and is not accompanied by pain or followed by bleeding. Pain and hæmorrhage are unmistakable indications for lengthening the intervals.

Once fairly established, however, the treatment by dilatation is carried on as described above, the full normal calibre being usually reached in two or three weeks. If the stricture is not resilient or irritable, or traumatic in its origin, it will be found that all symptoms have disappeared, unless, perhaps, the gleet persists for a time; but this, too, will finally subside. If the stricture is a recent one, it also may undergo absorption, but in any event the occasional introduction by the patient of a steel sound will always keep the case under control.

In the case of resilient, irritable, or traumatic stricture in this region, or of a stricture which for any reason, as the occurrence of rigors, is non-dilatable, external perineal urethrotomy is the operation of choice.

*Strictures of the deep urethra permeable only to filiform bougies.*

In certain cases no steel sound and no ordinary soft instrument can

be made to pass the stricture, but a persevering trial with filiform bougies made of whalebone will result in the passage of one into the bladder. This trial should be made persistently and patiently, and in the absence of retention of urine may be repeated on successive occasions.

If a filiform can merely be engaged in the stricture, but cannot be made to pass through it, it is good surgery and safe surgery, in the absence of retention, to tie it in place and allow it to remain *in sitû* for twenty-four hours. In the great majority of cases at the end of that time it can be passed with comparative ease into the bladder. There is no objection to still longer delay or to repeated trials if no urgent symptoms be present.

After the first instrument is introduced in such a case four courses are open to the surgeon: (1) He may allow it to remain in place with the certainty that in one or two days others may be slipped alongside of it and may be used as guides for the introduction, first, of a tunnelled catheter, and later of the ordinary soft or steel bougie; (2) he may attempt to conduct a tunnelled catheter over it into the bladder at once, to be followed by gradual dilatation; (3) he may conduct over it a tunnelled and grooved staff and proceed to the performance of external perineal urethrotomy; (4) he may use it as a guide for a Maisonneuve urethrotome, and may immediately perform internal urethrotomy.

These procedures have been mentioned in the order of preference and of safety. If the stricture which is being dealt with is not of traumatic origin and is not known to be specially resilient or irritable, the first method will lead up to the adoption of gradual dilatation with the greatest degree of comfort and absence of anxiety to both patient and surgeon. Even if there has been moderate retention, it is absolutely certain that the urine will pass with increasing freedom by the side of the filiform, and that the danger of the case, so far as retention is concerned, is at an end. If retention has been complete for a long time and is threatening, and the need for immediate relief is marked, it is well to adopt the second method and endeavor to catheterize at once. Failing in this, the third procedure should be employed in all cases of urgency and in all cases of traumatic, resilient, or irritable stricture, as well as in cases in which there is a history of frequent rigors after instrumentation. The operation is simple, is easily performed, and has a very small mortality. If the median line of the perineum be rigidly followed, hæmorrhage is insignificant, and in no event is likely to be dangerous. The stricture is freely divided, and, although not frequently cured, may be left, as in a successful dilatation, entirely under the control of the patient and the surgeon, the urethra having been restored to its full calibre.

The fourth procedure should be employed only in those cases in which the patient refuses to have the external operation performed. It is attended in the best hands with a distinctly larger mortality than any of the other methods mentioned, and there is no reliable evidence that it is followed by any larger percentage of real and permanent cures.

*Impassable Strictures of the Deep Urethra.*—If the methods of procedure which have been described are adopted, very few strictures will fall into this class; but occasionally, in spite of the most persistent efforts, no instrument can be made to enter the bladder. Occasionally, too, the distended and chronically inflamed urethra behind such strictures will have given way and permitted the leakage of a greater or less quantity of the urine into the surrounding structures. In either of these events the operation of perineal section becomes imperatively necessary. It need not be described in this article.

The traumatic urethritis, which the retained catheter or the frequent use of urethral instruments is said to give rise to in many of the cases above described, will almost disappear from one's practice if antiseptic irrigation is employed in such cases, and particularly if especial attention is paid to the sterilization of the urine by the internal administration of antiseptics. The sterilization of urine by boric acid or by salol is of great importance in the after-treatment of all these cases, and should never be omitted. These remedies are more effective if combined with full doses of quinine, but either of them is far more useful than quinine alone. They should be given with more freedom and more regularity in urethral and vesical operations.

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## CYSTITIS.

Inflammation of the bladder is due to a variety of causes. It may result from injury, as in the rough use of sounds; from the presence of a foreign body, as a calculus; from extension of urethral inflammation, as in cases of specific urethritis and of stricture; from new growths, as epithelioma; from infection with micro-organisms, the bacillus tuberculosis or the pyogenic staphylococcus; from drugs, such as cantharides. The pathological changes are those characteristic of inflammation of mucous surfaces, and vary with the acuteness and severity of the attack.

The symptoms are increased frequency of micturition, pain, tenesmus, and the altered condition of the urine, which contains pus, blood, mucus, and vesical epithelium from the first, and later becomes am-

moniacal and fœtid. This change occurs early in those cases in which by the use of dirty instruments saprophytic organisms have been introduced together with those of suppuration.

Removal of the causes, when possible, is of course indicated. A cystitis due to calculus or to new growth or to a retained catheter can be but little influenced by treatment until the stone or the tumor or the instrument is removed.

If the cystitis be due to the administration of cantharides or tincture of the chloride of iron or other drug, withdrawal of that article and the substitution of an alkaline diuretic will effect a prompt cure. In cases of cystitis following rough instrumentation, but in which no infection has taken place, rest in bed, restricted diet, anodynes or opiates to relieve tenesmus, and the administration of diluent and alkaline drinks will usually soon bring about a return to health.

When microbic infection has occurred, however, the case is apt to be much more serious and prolonged. The treatment then will depend on the duration of the attack. In the stage of *acute* inflammation the plan above mentioned should be rigidly followed out. The diet for some days should consist almost exclusively of milk; the patient should remain in bed with the hips elevated; the bowels should be moved by salines and enemata; opium by suppository should be used to control spasm and tenesmus; the following mixture may be administered with advantage:

℞. Acid. boric.,
Sodii bromidi, āā. ℈iv;
Tinct. opii deodorat., f℥iss;
Tinct. belladonnæ, gtt. xlviij;
Tinct. aconiti, gtt. viij;
Liq. potass. citrat., f℥viij.—M.
Sig. A table-spoonful every two hours until relieved.

Ordinarily, the intensity of the symptoms will subside under this treatment in a few days, and sometimes recovery will then be complete.

Often, however, the condition passes into a *chronic cystitis*, which is most intractable and obstinate. The same symptoms continue in a somewhat lessened degree. The urine becomes loaded with mucus and is voided with increased frequency, but with lessened tenesmus as compared with the acute variety of the disease. The treatment should consist of course at first in removal of the cause. If this is mechanical—that is, resulting from calculus, urethral stricture, prostatic hypertrophy, tumor, etc.—of course the treatment of the cystitis includes that of the condition which originated it. The treatment of vesical

calculus, of stricture, and of enlarged prostate will be found elsewhere in this article. That of new growths of the bladder is purely surgical and operative, and need not here be considered.

For a *chronic* cystitis which persists after the removal of a calculus or of a neoplasm, or after the dilatation of a stricture, or the careful withdrawal of residual urine in cases of atony or prostatic hypertrophy, a great variety of methods of treatment may be employed, and may be classified under—(1) the administration of remedies by the mouth; (2) the use of vesical injections or irrigations. In the former class are included the well-known balsams of copaiba and of cubebs and the large class of terebinthinates, with buchu, uva ursi, triticum repens, etc. Under this head should also be included the administration of antiseptics, which, when excreted through the kidneys, sterilize the urine and prevent or retard the development in it of micro-organisms. The most useful of these, in my experience, have been salol and boric acid. The method of employment has already been indicated. (See p. 591.) Among the materials which will be found valuable for vesical irrigation may be included solutions of nitrate of silver, ½ to 2 per cent. or stronger according to the sensibility of the patient; peroxide of hydrogen, from 50 per cent. to full strength; permanganate of potassium, from ½ to 3 or 4 per cent.; boric acid, from 2 to 10 per cent.; creolin, from 1 to 5 per cent.; corrosive sublimate, from 1 : 15,000 or 20,000 to 1 : 5000; carbolic acid, 1 : 500; and many others, chiefly belonging to the same class of antiseptics. I have found it useful to employ the weaker solutions in large quantities, and it is my custom to precede their introduction by irrigation of the bladder with boiled water, or, in the case of the silver and permanganate salts, by distilled water. In cases which fail to yield to these methods of treatment, and in which frequent urination and painful tenesmus are prominent symptoms and are accompanied by gradual failure of the general strength, a perineal cystotomy, followed by permanent drainage, will often be required, and will usually give marked relief and occasionally result in entire cure. It permits not only of the constant drainage which is so important in endeavoring to overcome sepsis, but also of the freer use of the irrigations above described.

Atony of the Bladder, by producing partial retention of urine, thus favoring decomposition, is a common cause of chronic cystitis in old persons, and may be described in this connection. It consists of a true muscular paresis; an actual loss of tone, as the name implies, in the muscular walls of the bladder; a positive weakness, associated with noticeable pathological changes and dependent upon well-recognized causes. There is a distinct thinning and weakening of the muscular coat of the bladder, sometimes associated with fatty degeneration of the muscular fibres, sometimes with a fibroid change resulting in con-

tracture precisely similar to that which occurs in disused muscles elsewhere. In the one case we have the bladder a mere flaccid pouch, capable of distension to a large extent, but quite incapable of completely emptying itself; in the other it will hold only a few ounces of urine, but cannot completely evacuate that quantity.

Between these two extremes and a condition of health there are all grades and degrees of atony. A common cause of these retrograde changes in the bladder apart from senility is over-distension, which may be chronic and dependent upon some obstructive condition, such as enlarged prostate, vesical tumor situated near the neck of the bladder, tight urethral stricture, etc.; and, again, may have resulted from true paralysis of the bladder, which is very apt in neglected cases to be followed by secondary atony; or may have been due to persistent neglect of the calls of nature on the part of the patient, whose occupation or whose pleasures were so preoccupying as to lead him habitually to postpone the emptying of the bladder until the need of doing so was imperative; or the cause may have been acute over-distension happening on some one single occasion when for a long period it was impossible for the patient to find an opportunity to urinate. In these instances the overstretching of the muscular fibres is probably the active factor.

I may group the methods of treatment which are worthy of trial under four heads, premising that if there is marked cystitis a preliminary course of treatment may be necessary before the other methods can be fairly put into operation:

*Catheterization.*—The patient should be instructed in the use of a catheter, and should also be told how to keep that instrument aseptic, and how for greater precaution to disinfect it before each insertion. He should use it in cases where four ounces of urine are retained twice daily, night and morning; if the residual urine reaches six ounces, he should use the catheter once every eight hours; and if it amounts to eight ounces, catheterization should be employed every six hours.

*Irrigation* of the bladder with cold boric-acid solutions, beginning at a temperature of 90° to 100° F., and gradually reduced, or permanganate of potassium in the strength of 2 or 3 grains to the ounce, will often be found of great use.

*Electricity* is often of considerable benefit, and may be employed in the manner long ago suggested by Sir Henry Thompson. An insulated electrode is carried into the bladder, and the other (moistened) electrode placed over the hypogastrium, a weak current being passed directly through the walls of the bladder. The strength is gradually increased until slight sensations of discomfort are experienced. The application may be varied occasionally by putting the other electrode in the rectum.

In mild cases which have come under my care immediately after the occurrence of over-distension this was an extremely useful adjuvant, but in later and more serious cases I have not found it of much benefit.

Strychnine is the only drug which, in my experience, has seemed to produce beneficial results in these cases, and even upon it but little dependence can be placed. It may be given in combination with ergot, cantharides, or tincture of chloride of iron.

### Hypertrophy of the Prostate.

The form of chronic cystitis depending upon *hypertrophy of the prostate* requires especial attention in relation to the existence of residual urine. Such patients should be examined in the following manner: Whenever, on account of frequent urination in a patient over fifty years of age, there is reason to suspect the presence of prostatic overgrowth, a rectal examination should be made, followed by catheterization with a soft instrument immediately after the patient has voluntarily voided as much urine as possible. If some enlargement is felt per rectum, but on the introduction of a catheter the bladder is found to be empty, and nothing else is present to account for the frequency of micturition, the probability is that that symptom depends upon a beginning enlargement of the prostate sufficient to obstruct the venous circulation in the neighborhood of the vesical neck. In this way it causes congestion of the mucous membrane lining the bladder and of the muscular walls of the latter, followed by symptoms of vesical irritation. The best treatment for this condition is to be found in the careful introduction of full-sized steel sounds, well warmed, rendered perfectly aseptic and lubricated with some aseptic or mildly antiseptic oil or ointment. The introduction of these at proper intervals (about twice weekly) will often be followed by great relief, and if attention is paid to preserving their absolute cleanliness and to introducing them as gently and skilfully as possible, the patient will often be preserved for a long time from the annoying condition of obstruction, and may even escape altogether. I have seen this in a sufficiently large number of cases to warrant this positive statement. The treatment may sometimes be aided by a deep injection of nitrate of silver, a few drops of a 1 or 2 per cent. solution deposited in the prostatic urethra often exerting in these, as in other conditions of irritability in this region, a remarkably sedative effect. Occasionally, without the slightest retention violent vesical irritation and great difficulty in urination will be observed, and will resist these methods of treatment, and then the whole line of medication, internal and local, above suggested will have to be followed, possibly without much result.

If the first examination reveals a certain quantity of residual urine, say more than one ounce, and especially if that which is found shows by

the presence of pus or by its bad odor that the bladder has already been infected with pyogenic or saprophytic organisms, it will be necessary to advise the systematic and regular use of the catheter; and this can be done by no one to such advantage as by the patient himself if he is intelligent and has been properly instructed. The instrument to be used should preferably be a Nélaton, or, if this refuses to pass, a Mercier, catheter. The most scrupulous attention to the preservation of asepsis should be paid from the very first introduction of the instrument by the surgeon, as the whole future of the patient, both as to comfort and as to the prolongation of life, may and probably will depend upon the non-infection of the bladder. The instrument should be cleansed before and after using, should be kept in a saturated solution of boric acid, and should be lubricated only with carbolized oil (1 : 40) put up in small quantities and kept tightly stoppered in the intervals of use. The frequency with which the catheter should be used must be proportionate to the amount of residual urine and the urgency of the symptoms. As a rule, where the urine does not exceed in amount two or three fluidounces and is not turbid or bad smelling, the use of the instrument at bed-time will be sufficient. If, however, the urine is ammoniacal, or if it is of larger amount, or if the patient urinates with some pain and greater frequency, it may be well to catheterize two, three, or even four times daily. (See p. 614). Experience and familiarity with the special needs of each particular case must decide this question. No drugs that I have ever employed have seemed to me to have the slightest effect upon the hypertrophy itself, but drugs which render the urine aseptic will be found valuable adjuvants in these as in nearly all other surgical diseases of the genito-urinary tract. It may be necessary to combine with them in certain cases the bromides, belladonna, or small doses of opiates, but these should always be regarded as necessary evils, to be used only in exceptional cases or in times of emergency, and to be thrown aside as soon as they can be dispensed with.

In spite of every antiseptic precaution a number of cases break down; the catheter cannot be passed without distress or without causing troublesome bleeding, or occasionally cannot be passed at all. The urine becomes ammoniacal and stinking. Vesical tenesmus is constant and severe. These are the symptoms which, above all others, indicate the performance of prostatectomy: viz. difficult and painful catheterization and the occurrence of marked and persistent cystitis. In the presence of these symptoms in a person of average strength and vitality the surgeon should, in my judgment, proceed in one of the two following ways:

First: Introduce Symes's staff into the bladder and make a small incision through the perineum and the membranous and prostatic

urethra. Introduce the finger into the bladder. If a pedunculated middle lobe is found, enucleate it with the finger or twist it off with forceps. Put in a large drainage-tube and allow it to remain for a week or two.

Or second: Make a suprapubic cystotomy, remove only such portions of the prostate as are manifestly obstructing the urethral orifice, and then, if the urethra is not free, complete the operation by doing an external perineal urethrotomy.

Statistics are not yet numerous enough to allow us to be dogmatic as to the relative merits of these plans, but I am inclined to think that in the majority of cases the second is the one to be preferred.

In markedly feeble cases, and especially in those with chronic nephritis, it is best to be content with establishing perineal drainage.

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## VESICAL CALCULUS.

As this article is intended especially for practitioners of medicine, a word of general advice as to examination for stone may not be amiss. Every surgeon, especially if he has seen large numbers of genito-urinary patients, must have noticed the great frequency with which cases of calculus have been mistaken for simple cystitis and have been treated in various ways more or less useless, and usually harmful from the loss of time which they entail. Old persons have their frequent and painful urination assigned to the enlarged prostate which often coexists and is recognized by the rectal touch, the examination not having been completed by the introduction of a sound. Children have their incontinence referred to a long and adherent prepuce, and are circumcised; or it is attributed to nervousness or to habit, and they are dosed with bromides and belladonna, or are even whipped severely in the vain effort to cure a symptom, the cause remaining undiscovered. Women and young girls are especial sufferers from this too common habit of neglecting or postponing a vesical examination, motives of modesty often leading them to throw obstacles in the way of the medical attendant.

I quite agree that instrumental examination of the bladder, trifling and painless as it almost invariably is in proper hands, should be regarded as a surgical procedure not to be undertaken without distinct indication; and I also recognize the fact that strong contraindications sometimes exist. In the presence of acute inflammation, of a narrow or tortuous stricture, of marked enlargement of the middle lobe of the prostate, it is not desirable to insist upon an exploration for calculus by inexperienced hands, even if the symptoms point strongly in that

direction. But these cases are the exception, and, as a rule, when a patient comes under observation who presents the group of symptoms characteristic of stone—viz. frequent urination, aggravated by exercise or movement; pain, especially at the termination of the act and near the end of the penis; blood following the stream of urine; occasional sudden stoppage of the stream before urination is complete, etc.—it is well to insist upon an examination of the bladder. Even if only two or three of these symptoms are present and there is no other obvious cause, the examination should be made, nor should it be neglected in the majority of cases even if another *apparently* sufficient cause be present.

The *non-operative treatment* of vesical calculus is of chief importance as regards prophylaxis. The attempt to procure solution of a stone already in the bladder has been persevered in by the profession since the earliest days, but without practical result. Neither drugs by the mouth nor vesical injections can be used in sufficient strength to exert any material influence upon a calculus. It is conceivable that a very small and very soft phosphatic stone might be affected by acid solutions weak enough to permit of their being thrown into the bladder, but litholapaxy for such stones is so immensely superior in safety and certainty and promptitude of cure that no other method need be considered, least of all one of such doubtful utility.

When it comes to the *prevention* of stone, however, the case is different. The advice given to a lithæmic patient who has perhaps had one or more attacks of renal colic, or who is habitually passing urine of high specific gravity containing an excess of uric acid, is of the utmost importance. With such a patient it is essential to regulate the diet, the exercise, and the mode of life generally. My custom for years in these cases has been to encourage the free use of water as a beverage both at and between meals, and especially on going to bed and on rising. I think the particular sort of water to be used a matter of minor importance, as the results have been equally good whether ordinary cistern or rain water, filtered or distilled water, or Poland, Bedford, or any other of the still spring-waters was employed. The dilution of the urine, and the consequent increased solvent power, seem to be secured as well by one as by the other, provided only that a sufficient quantity be taken. If the limits of this article permitted, I could dilate upon many other beneficial effects which I think I have seen follow the habitual use of large quantities of water, in regard to which I heartily concur with the teachings of Sir Henry Thompson. In persons whose general strength is below the average, and particularly in thin or emaciated patients with imperfect digestions, milk may to a large extent take the place of water. It should be used always with special care as to the effect upon the gastro-intestinal tract, and may

have to be peptonized or skimmed or diluted with plain water or with lime-water to meet the needs of the particular patient. In the majority of persons who habitually pass concentrated urine it will be found to be in some shape the best of all articles of diet, and I always make a persevering effort to secure its employment even when, as is so frequently the case, the patient protests that milk does not agree with him.

As to the general dietary, the most important articles to cut off are the sugars and fats, the most important to restrict are meats and alcohol. Such patients should be told to eat meat but once daily, and then sparingly; to take a minimum of sugar and of butter or other fats; to drink little but water or milk or weak tea, or if wine be taken to select a light claret or white wine and drink it largely diluted. Green vegetables, salads, and fruits, bread, eggs, and light fish, with a little poultry, may be said to constitute the staple of the diet in these cases.

The occasional use of a mild laxative or of small doses of calomel and soda in patients who are inclined to torpidity of the liver and defective bile-secretion will be found advantageous, but the prolonged use of the saline purgatives, such as Epsom or Glauber's salts, or of the waters containing them, Friedrichshall, Carlsbad, Hunyadi, etc., is distinctly contraindicated, favoring rather than preventing concentration of the urine.

Moderate exercise is extremely beneficial, especially if it can be taken in the open air and systematically.

Excessive exercise to the point of great muscular fatigue and profuse sweating should be avoided.

As to drugs, it may be necessary to use either alkalies or acids according to the reaction of the urine and the character of the sediment. In acid urine with excess of uric acid and of the urates phosphate of sodium in full doses, taken with a large quantity of fluid, often seems to be of great benefit, but occasionally has no effect whatever. The magnesium salts have been recommended, especially the boro-citrate, where the indications for alkalies were persistent.

If the oxalates or phosphates are the predominant elements in the urine or are intermingled, which is often the case, the mineral acids, especially the muriatic and nitro-muriatic, and to a less extent phosphoric, acids are of extreme value; and this is increased if they are given in conjunction with nerve-tonics and with bitter stomachics. In these cases special attention must be paid to the surroundings of the patient, to securing proper hygienic conditions, plenty of exercise and fresh air, absence of mental strain or overwork, and, more important still, avoidance of worry and trouble as far as possible. Attacks of stone are sometimes coincident with a certain degree of nervous break-

down, often attributed to the pain and distress of renal colic and of the vesical irritation, but rather to be regarded, in many cases, as a precedent etiological factor of much importance.

In the preventive treatment of stone of whatever variety the avoidance of catarrhal conditions of the urinary tract is of the greatest importance. In the absence of the colloids the crystalline deposit of even the densest urine will remain in the shape of a fine dust or sediment, and will have little or no tendency to adhere or consolidate in large particles. The formation of stone depends in the great majority of cases upon the presence of an agglutinating material binding together the urinary deposits. This is found in the vesical mucus, which is in great excess in all chronic catarrhal diseases of the bladder, and the production of which is favored by the existence of stricture or of hypertrophied prostate or vesical atony with residual urine.

The treatment of these conditions and of the chronic cystitis which so often accompanies them (see pp. 614, 616) is therefore of the utmost value in the prophylaxis of vesical calculus.

A stone having once formed, the *operative treatment* applicable for its removal varies according to a number of factors, chief among which are—1, the size of the stone; 2, its composition; 3, the condition of the kidneys; 4, the presence or absence of obstructive disease, as urethral stricture; 5, the condition of the prostate and bladder; 6, the age of the patient.

Space will not permit me to discuss these points fully, but simply to lay down, as I have done in the case of stricture, the broad rules which should guide the general practitioner in advising his patients even when he calls in other help for the operative treatment.

The three possible methods of removing a given stone from the male bladder are—1. Perineal lithotomy—*a*, lateral, *b*, median; 2. Suprapubic lithotomy; 3. Litholapaxy. The remarkable change brought about in the treatment of calculus by the introduction of the last-named method has greatly reduced the field of the first two. I am not willing to regard them as having been "blotted out of practice," as has been the case in regard to lithotrity by the old plan, in which several sittings were necessary to crush a stone and the fragments were left for spontaneous evacuation by the patient. The limitations of their employment since the development of litholapaxy, and especially since its extension to children, may well be indicated by the experience of Thompson, who in former days found it necessary to cut one in every four patients with calculus, and who now cuts but one in thirty.

It is safe to say that in adults *perineal lithotomy* should be done chiefly under the following circumstances: 1. In cases of deep urethral stricture rebellious to dilatation, in which by selecting the median method the stricture may be divided at the same time. 2. In cases of

stones of moderate size and of such hardness and density as to make too great demands on the strength of the lithotrite or of the operator. This condition is not now thought to occur very frequently. 3. In cases of atony of the bladder where there is little or no expulsive power, where there is already a chronic cystitis, and where the stone is of medium size.

*Suprapubic lithotomy* should be selected—1. When the stone is an unusually large one and at the same time is believed to be of exceptional hardness. 2. In cases of marked prostatic hypertrophy with pouched bladder, chronic cystitis, and large stone.

*Litholapaxy* is the method appropriate to nearly all other cases, though a few exceptions to the foregoing rules may result from the presence of such complications as advanced kidney disease, vesical tumor, etc.

In cases of vesical calculus in *male children* it is not possible at present to express so dogmatically the views of the majority of the profession, as much difference of opinion still exists, but my own opinion may be summarized as follows: 1. In every case of calculus in male children litholapaxy, on account of ease of performance, low mortality, speedy recovery, and absence of danger of emasculation, should be the operation of predilection, division of the meatus being freely resorted to if that portion of the urethra offers an obstacle to the introduction of instruments. 2. The lithotrite and evacuating-tube should be of a size which can be inserted into the bladder without much effort or over-distension, and great gentleness should be observed in passing these instruments. 3. They should be withdrawn and reintroduced as seldom as possible, the stone being finely pulverized before the lithotrite is taken out at all. In seeking for or attempting to seize the stone care should be taken to avoid such wide separation of the blades as will bring the male blade in frequent contact with the vesical neck. The crushing should invariably be done only after rotating the blades into the centre of the bladder. Every particle of the calculous dust should be evacuated. 4. Rest in bed, milk diet, and sterilization of the urine by boric acid or salol, given internally both before and after the operation, are valuable adjuncts. During the operation every antiseptic precaution should be observed. 5. The exceptional cases of calculi which are both large and hard may be best treated by suprapubic lithotomy, but neither unusual size nor a moderate degree of density should of itself alone be thought positively to contraindicate litholapaxy. 6. Perineal lithotomy has now a very limited field, and should be employed chiefly in those cases of stones thought to be of small or medium size in which no lithotrite, however small, can be introduced with safety.

The treatment of stone in *women* is at the present time practically confined to three procedures:

1. If the stone is quite small the urethra may be stretched to the required extent, first by suitable dilators, then by the little finger, and then the forefinger. If this is done slowly, there will be but little laceration of the mucous membrane, and the incontinence that follows will be of short duration. The stone may be extracted with the finger, or by means of a scoop or a pair of forceps.

2. If it be too large to extract in this manner, the dilatation of the urethra should be carried to a sufficient extent to permit of the introduction of a lithotrite; litholapaxy should then be performed in the usual manner.

3. If the stone is at once extremely large and exceptionally hard, suprapubic lithotomy should be employed, but it is very rarely necessary.

The same rules are applicable to cases of stone in *female children*, although, of course, the dilatation of the urethra cannot be carried to the same extent.

Incision of the urethra and neck of the bladder should not be employed in any case, on account of the risk of permanent incontinence. Vaginal lithotomy, while it still has its advocates, is inferior to the methods above described.

# DISEASES OF THE PREPUCE, GLANS PENIS, AND TESTICLES.

By EDWARD MARTIN, M. D.

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**Congenital Deformities of the Prepuce.**—The foreskin may be absent, incompletely developed, or excessively developed. The frænum may be unduly short. The preputial orifice may be exceedingly small or even completely obliterated.

The absence or slight development of the foreskin is a condition to be desired rather than remedied, though certain German surgeons, with an ingenuity worthy of their nation, have devised a plastic operation for the restoration of this covering of the glans, and have named this procedure postheoplasty.

Excepting narrowing or occlusion of the preputial orifice, congenital malformations of the foreskin are of such slight clinical significance that it is not necessary to consider the therapeutics. Phimosis (narrowing) and occlusion, however, may occasion grave local and general symptoms and often require prompt treatment.

Where the orifice of the prepuce is congenitally occluded, even if this is not at first discovered by inspection, it will shortly be manifested by a bulging of the preputial sac as the child evacuates the bladder. It would seem that this condition should be detected very shortly after birth, yet Demarquay cites the case of a child four and a half months old who had never passed water. Examination showed a tumor the size of a bladder attached to the penis. On incision a considerable quantity of urine was evacuated.

The treatment of occlusion should not be limited to merely forming an opening for the flow of water, but should terminate in a carefully conducted circumcision.

**Phimosis** or narrowing of the preputial opening is a condition present in the very great majority of young children. As to the amount of narrowing which justifies the use of the term "phimosis," this word is used ordinarily to convey the idea that the preputial opening is so narrow that the foreskin cannot without forcible stretching be stripped behind the corona. In most children under six or eight years of age,

certainly 95 per cent., the prepuce cannot be stripped back. In many the meatus cannot even be exposed, yet in the great majority of these cases the functions of urination are carried on normally without exciting local irritation.

In certain cases, however, the opening is so narrow that the prepuce is ballooned out each time the child urinates. From retention of some urine within the preputial sac, and possibly from stretching occasioned by this ballooning, inflammation is set up, resulting in a mild balanoposthitis. The edges of the preputial opening become excoriated, the lips of the meatus become somewhat reddened and puffed, and the evacuation of urine is attended with considerable pain, the child frequently screaming, pulling at his prepuce, and delaying as long as possible the passing of his water. Under these circumstances operative interference is imperative. In another series of cases, even though the meatus can be exposed and there seems to be no mechanical impediment to the passage of the water, the lips of the meatus are found to be puffed and everted and the child cries at each micturition. At times, even though the meatus seems normal and micturition is not accompanied by pain, the foreskin is found tightly adherent to the greater portion of the glans, and in the coronary sulcus there is often a considerable quantity of hardened smegma. The symptoms dependent upon this condition seem to be purely reflex, and simulate a variety of nervous or surgical affections. Spastic palsy, incipient coxalgia, epileptiform convulsions, incontinence of urine, recurrent colic, have all been immediately relieved by circumcision in such cases. One reporter practising in a small town states that he has cured 18 cases of epilepsy by removing in each case a tight foreskin. After an experience of seven years in the largest children's hospital in Philadelphia, I can assert that I have never seen such a case—*i. e.* pronounced reflex disturbances from a phimosis which was not exciting local inflammation—and the testimony of my colleagues has been to the effect that this is exceedingly rare.

When inflammation is present almost any reflex may be excited; thus I have more than once relieved the convulsions of an infant by removing a foreskin which was exciting inflammation. If, however, the surgeon depends upon relieving epilepsy in children by removing a foreskin which even though tight and adherent is exciting no local symptoms, he will certainly be disappointed in the very great majority of cases.

In all cases the preputial opening can be stretched so that the foreskin can be stripped back over the glans, and the mucous surfaces of the glans and the foreskin can be thoroughly cleansed. This admits of no exception. In children, at least, there is no such thing as a phimosis so tight that it cannot be reduced, unless there is a balanoposthitis of

such high degree that there is great œdema or inflammatory induration of the prepuce.

Daily stripping back, with cleansing and the application of soothing ointments, will subdue inflammation, and will so enlarge the contracted orifice that retraction can be accomplished without giving pain. Though stripping back is always possible, I believe that in the great majority of these cases circumcision would give the best results.

To strip the prepuce back the body of the penis must be made as prominent as possible, that it may act as a point of counter-pressure. To accomplish this, the finger and thumb of the left hand should tightly grasp the skin near the root of the penis, and should be pinched together slightly to prevent the body of the penis from sliding backward. Reflex action often aids the steadying of the penis, since in young children even slight handling of the organ generally occasions erection. Holding the penis thus steadied with the finger and the thumb of the right hand, the prepuce is stripped back as far as possible. When it yields no farther, the extremity of a fine pair of dressing forceps is inserted into the opening thus made and the blades of the forceps are gently separated. If the opening is too small to admit the forceps, the points of two probes should be employed, by which the opening may be enlarged. On withdrawing the divulsor the foreskin can be still further retracted. In the majority of cases it will be found as the glans is exposed that adhesions have taken place between the two mucous surfaces. These can be readily stripped by means of the thumb-nail or the end of a probe.

It is a common mistake in this stripping back of the prepuce to stop when the corona of the glans is reached. This leaves a ring of smegma in the coronary sulcus, which in some cases is responsible for a variety of serious reflex disturbances. The stripping of the prepuce should continue until the coronary sulcus is fully exposed from one side of the frænum completely around to the other. All the smegma should be cleared out, the glans should be washed carefully with a mild antiseptic solution such as boric acid, should be anointed with boric ointment, and the prepuce should be immediately drawn forward, as swelling takes place rapidly and paraphimosis readily may result. Daily for two weeks the surgeon should retract the foreskin, wash the parts, and anoint with boric ointment. After that this function may be entrusted to the parents. This leaves the child with probably an elongated prepuce, but one which, if proper attention be given to cleanliness, will remain entirely normal and give rise to no trouble.

It is usual, among medical men, to regard the stripping operation as safer than a formal circumcision: this would no doubt be true were

the same precautions as to cleanliness observed in stripping as in cutting, but since it is very common to tear adhesions without the operator even taking the precaution to wash his hands, infection sometimes occurs. I know at least one case in which death from cellulitis resulted as a consequence of the stripping operation, and I have seen cases in which the resultant inflammation excited serious alarm.

The objections to a long prepuce are that it is difficult to keep clean the parts covered by it; that in children it renders the performance of masturbation easy, and if from neglect of cleanliness it becomes slightly inflamed, it occasions a local erythism which by favoring handling may lead the child to self-abuse without any previous teaching; and that in grown persons by keeping the covering of the glans soft and macerated it favors the contraction of venereal diseases. These objections are all valid.

It is hard to state just in what the advantages of the prepuce lie; hence, since the operation of its removal is as safe as any surgical procedure, it would seem advisable to counsel circumcision in all cases of phimosis; that is, in all cases where the prepuce entirely covers the glans and where its retraction is difficult or impossible.

Circumcision.—The details of this operation need not be considered here. In general terms it may be stated that a ring of preputial mucous membrane not wider than a quarter of an inch should be left, and that the skin should be removed as far back as the coronary sulcus. I believe the use of phimosis forceps simplifies the operation. Without making any traction upon the prepuce the surgeon should determine the position of the coronary sulcus: this may be marked by means of a dermatograph or soft pencil; the prepuce should then be drawn forward, and the phimosis forceps should be applied at the position marked, care being taken to see that the glans penis is not included in the grasp of the instrument. The incision through the fenestra of the forceps will remove mainly the skin, leaving the mucous membrane almost intact; this is particularly the case when there are tight adhesions. By means of a pair of scissors the mucous membrane may be split up and cut around the corona, the adhesions first being separated by rough sponging or by means of blunt dissection.

A fringe of mucous membrane not wider than a sixth of an inch should be left. To this the skin is secured by horsehair sutures, the first stitches being applied in the region of the frænum, and being so placed that they control the frænal arteries. Bleeding should be controlled by stitches or by torsion. If the operation has been conducted with careful attention to antisepsis, iodoform collodion forms the simplest dressing. A narrow strip of iodoform gauze is first placed around the line of suture, and this is secured in place by iodoform collodion. In five days the dressing and sutures can be removed. In

place of collodion dressing the seat of operation may be wrapped in a narrow strip of lint soaked in diluted alcohol, lead-water and laudanum, or phénol sodique, 1 part to 5 of water. Whichever solution is used, the dressing should be kept wet with the same lotion for five days, when the stitches may be removed.

Although the operation of circumcision is exceedingly simple, if it is not properly conducted it may result in consequences which reflect little credit on the surgeon. I have seen, as a result of leaving too much mucous membrane, a recurrence of phimosis much more marked than the condition for which the operation was undertaken. Again, I have known of patients who complained bitterly because so much skin was removed that there was serious interference with erections. Even when the operation is skilfully performed there may be left an irritable neuralgic condition about the frænum which occasions the patient far more distress than the condition for which the relief of the operation was directed.

**Paraphimosis.**—This term is applied to the condition which obtains when a tight prepuce has been drawn back behind the corona glandis and cannot be brought forward again. When the preputial orifice is narrowed, there quickly follows upon forced retraction rapid swelling consequent upon constriction. This may result in gangrene, involving usually the strangulated skin, but sometimes attacking even the head of the penis. To one who has seen this condition the diagnosis is unmistakable. Back of the glans penis, or possibly entirely covering this, there is a thick collar of œdematous skin. The penis seems kinked, deformed, and enormously swollen; a deep notch is noticed on its dorsal surface just back of the corona. The swelling is particularly marked at the lower part of the foreskin and about the frænum.

No time should be lost in reducing the paraphimosis. Where the œdema is very great, so great as to seriously interfere with reduction, it may be lessened by making multiple punctures with the point of a small lancet or with an ordinary surgical needle. The thumbs of the two hands are then placed on either side of the glans and the index and middle fingers of each hand are placed behind the swelling, By pressing backward with the thumbs and pulling forward with the fingers the paraphimosis, if recent, can be reduced.

If this manipulation is not successful, the whole glans can be wrapped from before backward in a small gum band. This compresses it so that the handle of an instrument can be slipped under the constricting ring. On removing the band the glans can then be reduced.

If manipulations fail, the constricting band must be incised. This is usually best done from within outward.

It must be borne in mind that the constriction is placed in the

second and not in the first depression behind the corona. It should be freely divided and the prepuce should be brought forward. When the paraphimosis is reduced the glans disappears entirely, and can only be brought into view by forcible retraction of the foreskin. Several times I have seen reduction apparently accomplished, when in reality the œdematous and constricted mucous membrane lying to the distal side of the constriction had simply been pulled over the glans, relieving the strangulation not at all.

After reduction the parts should be dressed in lead-water and laudanum or other evaporating lotion.

**Balanitis and Balanoposthitis.**—Phimosis is frequently complicated by balanoposthitis, or inflammation of the mucous surfaces of the glans and prepuce. From the milder form of this inflammation nearly every one with a redundant prepuce who neglects daily ablutions has suffered. It is characterized by an itching and tingling at the end of the penis, by slight redness, by the discharge of very offensive purulent matter, by moderate swelling, and by a free secretion of smegma. On stripping back the prepuce the coronary sulcus is found filled with a fœtid, cheesy mass; the mucous surfaces are hyperæmic and sensitive. Thorough cleansing with mild antiseptic solutions accomplishes a speedy cure.

A severer form is often noted in gonorrhœa. Here the prepuce swells to such an extent that stripping of the glans is often impossible. There is a free purulent discharge from the meatus, considerable itching, and all the signs of an acute inflammation. If the glans can be stripped back, an inflammation of an erosive type will be found upon the mucous surfaces of both the prepuce and glans.

Surcinate erosive balanoposthitis is an inflammation of still more severe type, at least in so far as its obstinacy to therapeutic measures is concerned. It starts usually from the corona, runs toward the meatus, and ceases only when the entire surface of the glans and foreskin has become involved. This may require several weeks. It stops abruptly at the meatus, and is said to be caused by a specific micro-organism, the spirillum. The treatment of the gonorrhœal and erosive forms of balanoposthitis consists primarily in thorough cleanliness. If the prepuce can be stripped back, the eroded surfaces, after a thorough washing with saturated boric-acid solution, carbolic solution 1 : 200, or bichloride solution 1 : 5000, should be dried carefully by lightly touching them with absorbent cotton, should be touched with a 4 per cent. solution of nitrate of silver, should be dried again as thoroughly as possible, and the whole glans should be covered by a very thin layer of absorbent cotton, over which the prepuce is drawn. This prevents the immediate contact of the mucous surfaces. Where the discharge is profuse, after touching with nitrate of silver very

finely powdered alum may be dusted over the eroded surfaces, the dressing being completed as before, or powdered tannin may be substituted for the alum. If dusting powders are used, great care should be taken to see that they are not lumpy or gritty. The dressing should be repeated every two or three hours during the acute stage of the disease. The application of the silver once a day is sufficient.

The swelling of the prepuce is best combated by the application of evaporating lotions. For this purpose lead-water and laudanum may be employed, or witch-hazel, or a prescription made up of the fluid extract of hydrastis canadensis 1 part, dilute alcohol 4 parts; or muriate of ammonia 1 part, dilute alcohol 4 parts. Cloths saturated in any one of these solutions should be wrapped about the penis, and should be kept constantly wet, no effort being made to prevent evaporation. Where the swelling becomes so great that sloughing threatens, an effort should first be made to relieve tension by multiple punctures. If this fails, the prepuce should be freely split open along its dorsum. Failure to relieve tension not infrequently results in the formation of a sloughing ulcer, which when it heals may produce much deformity by contraction of the resulting cicatrix. Prolonged soaking in hot water affords an excellent means of treating both the erosions of balanoposthitis and the inflammatory swelling of the foreskin. By prolonged soaking is meant a local bath of at least two hours in duration, repeated twice a day if possible. The water in which the penis is soaked may be rendered mildly antiseptic, and should be kept as hot as can be borne with comfort.

**Herpes Progenitalis.**—Following irritation, either from venery or from lack of cleanliness, there often develop growths of vesicles upon the surface of the glans penis and inner surface of the prepuce or upon the cutaneous surface of the latter reflexion. This inflammation begins as a vesicle with a slightly inflammatory base, and when observed upon the cutaneous surface of the foreskin runs a course very like that of the fever blister commonly observed about the mouth. When it is situated upon the mucous surfaces, however, the thin covering of the vesicle quickly softens and ruptures, leaving rounded, entirely superficial excoriations. These under proper treatment heal in a few days. When neglected the excoriations may run into distinct ulcers, thus making the diagnosis from chancroid difficult if not impossible unless the auto-inoculation test be tried. The herpetic ulcerations begin as vesicles, usually remain superficial, and are found in groups; they may, however, if neglected, occasion balanoposthitis, and in persons of a depraved constitution may run into deep ulcerations.

After an attack of herpes there is a tendency for the diseases to recur. When this is the case tonic treatment is indicated. The local treatment consists in careful washing, touching with nitrate of silver,

and dusting with calomel, zinc oxide, or other slightly astringent and absorbent powder. As in balanoposthitis, the mucous surfaces should be kept separated by a thin layer of absorbent cotton.

**Vegetations of the Glans and Prepuce.**—Originating in the papillary layer of the derm and covered by a thin layer of the epiderm, these vegetations are of very frequent occurrence. They may take the forms common to papillomata as observed in other regions of the body; they may be single or grouped together. They may be flat, without pedicle, or thread-like. The individual growths may remain discrete or they may form a large fungoid mass.

These vegetations are due to some form of irritation, most frequently of a venereal nature, although they not infrequently follow herpetic or eczematous inflammation, or even the slight hyperæmias dependent upon a mild grade of balanoposthitis due to retained smegma. They are readily recognized; though when they attain large development and grow under a prepuce too narrow to be retracted the diagnosis is not so easy, since from pressure sloughing may take place, giving rise to a profuse fœtid discharge, which in connection with the indurated swelling felt through the prepuce may readily engender the suspicion of cancer.

Without treatment vegetations may remain stationary, may spontaneously disappear, or may grow rapidly, reaching huge dimensions. These papillomatous growths should be excised as soon as detected, since there are strong reasons for believing that, though in themselves benign, they are often the starting-points for malignant growths. For the purpose of removal a pair of scissors curved on the flat should be used. Where the growths are discrete and small, each excrescence may be seized with a pair of fine rat-toothed forceps, drawn up slightly, and a small portion of the mucous membrane may be cut off with the growths.

Where there is a large cauliflower excrescence extending completely around the coronary sulcus, and involving a considerable area of the foreskin, the whole should be removed by means of the scissors as close to the base as possible. This removal may be followed by the application of pure carbolic acid. The hæmorrhage is free at first, but soon stops.

Other means of treatment are sometimes successful. Constant touching with 10 per cent. chromic acid or with nitric acid finally results in entire disappearance of the growth. If there is doubt before operation as to the cancerous nature of the excrescence, this is promptly settled by the first cut of the scissors, since the cancer *infiltrates*, while the papillomata are purely superficial. Ordinarily these papillomatous growths are accompanied by no discharge, and, excepting from a cosmetic point of view, occasion no inconvenience. When they become

large, and particularly when they are confluent, they may secrete pus freely and may give rise to pain and constitutional disturbance. The best preventive of this complication is repeated washings with mild antiseptics and the application of astringents, such as tannin, nitrate of silver, etc.

**Preputial Calculi.**—Preputial calculi are generally found in infants in whom there is a well-developed phimosis. Urine, being retained in the preputial sac, has a tendency to deposit its salts. By successive deposit calculi of large size may be formed. Some are described as large as a hen's egg. At times, instead of one stone, many are observed. When no treatment is adopted these calculi may remain for years, causing pressure-atrophy of the glans.

The treatment consists in circumcision and removal of the foreign body. Since these concretions are only found in well-marked cases of phimosis, the diagnosis may at times be difficult, the enlargement closely simulating a malignant growth. The history of the case and examination with a probe will very shortly make plain the nature of the case.

Phimosis also exposes those exhibiting this malformation to retention of sebaceous matter which may form concretions of some bulk, and which by the irritation they excite usually give rise to purulent discharge so like that of gonorrhœa that it can only be distinguished by bacteriological examination.

The treatment is the same as for urinary calculi.

**Folliculitis.**—There are situated behind the prepuce and about the urethral meatus a number of mucous follicles which not infrequently become involved in gonorrhœal inflammation. They discharge pus which contains gonococci, and which may readily convey the disease. It is important to diagnose this condition, since a contagious discharge may persist from these follicles for some time after urethral gonorrhœa is cured. Glandular folliculitis may be recognized by localized hyperæmia about the opening of the follicle, by very slight purulent discharge, the latter being made evident by squeezing the surrounding tissues, and by the detection of a patent follicle, made still more apparent by means of a magnifying-glass.

The treatment consists in thoroughly cauterizing the follicle to its deepest portion by means of a hot needle or a sharp stick of lunar caustic.

**Lymphangitis of the Prepuce.**—As a very rare condition the lymphatic vessels of the prepuce are sometimes dilated sufficiently to give rise to local trouble. These vessels appear as small rounded cords, perfectly transparent, best seen over the mucous surface when the foreskin is strongly retracted. They start in the region of the frænum, and pass upward and backward toward the dorsum of the

penis. They commonly appear after coitus; the swelling gradually subsides in a few days, to reappear after each period of sexual excitement. Finally, they become permanent. When the disease is well marked, following coitus or other mechanical disturbance there is often local inflammation, attended with pain and considerable swelling.

When the affection is intermittent, prolonged hot baths and the application of local astringents will usually effect a cure. When the dilatation becomes permanent, cure is best accomplished by occasioning cicatricial obliteration of the lymphatic channel. This end is attained by passing a thread through the lumen of the vessel and leaving it in place for ten or twelve hours. This is followed by considerable tumefaction of the lymph-vessel, but ultimately results in a cure. The thread should be passed at the frænal extremity of the vessel.

Cure may also be accomplished by picking up the frænal extremity of the vessel in a pair of rat-toothed forceps and removing a portion of its length by a pair of curved scissors.

**Varices of the Prepuce.**—Dilatation of the preputial veins is commonly observed incident to the causes which occasion a determination of blood to this region. The dilated veins rarely occasion any inconvenience, but if objectionable from a cosmetic point of view may be readily cured, either by ligation in two portions and excision of the portion of the vein lying between, or, better still, by circumcision.

The prepuce and glans penis are of course exposed to the skin diseases incident to mucous and dermal surfaces, and are particularly subject to the manifestations incident to inoculation of syphilitic and chancroidal virus.

The treatment of these various affections is sufficiently described in other sections of this work.

**Horny Growths of the Glans.**—As very rare manifestations of perverted epidermic growth, horny outcroppings have been noticed upon the surface of the glans penis. These can be recognized without difficulty, and would be of little pathological importance excepting for one fact—namely, that they are at times the forerunners of cancer.

The treatment adopted in such cases should be the removal of the portion of the glans from which the horny growth takes its origin. In cases of advanced age, where there is no pressing necessity for interference, it is probably better to counsel against surgical operation.

**Malignant Disease.**—Epithelioma commonly appears in the form of a warty, cauliflower outgrowth which rapidly ulcerates, presenting a characteristic raspberry-like mass. The ulcer is provided with a hard base and is irregularly excavated. The surrounding skin is infiltrated and œdematous, nodular, elevated, and purplish in color. The disease, beginning as a small vegetation, gradually becomes diffuse till a large

portion of the surface of the prepuce and glans is involved. The glans may be twice its normal size, irregular, and lobulated; it may ulcerate in some places, in others may exhibit papillary outgrowth. As the disease extends backward the cavernous bodies become indurated, and the overlying skin, at first slightly adherent, is involved in the disease. The lymphatic glands of the groin are finally infiltrated; they ulcerate and discharge fœtid, blood-stained pus. An epithelioma of the penis may run a rapid or slow course. Some cases perish in two months; others survive for twenty years.

It is sometimes difficult to diagnose epithelioma of the penis in its early stages from papilloma, but when without obvious cause a warty growth develops in a person past middle life, when an induration is noted about the base of such warty growth, and finally when this excrescence ulcerates, there are sufficient grounds for making a diagnosis of malignant disease and adopting appropriate treatment.

When the disease is observed in its early stages, thorough excision, the knife being carried wide of the indurated tissue, followed by cauterization, may result in cure. When the induration has progressed to ulceration, amputation is the only resource. The operation should be performed through healthy tissues, even if such a procedure involves the loss of the entire penis. If the lymphatic glands are already enlarged, the prognosis is exceedingly gloomy, even should the surgeon, in addition to amputating the penis, excise all diseased glands within his reach.

If epithelioma be excepted, malignant disease of the glans penis or prepuce is a very rare affection. Cases of medullary cancer have been described, developing at about the period of puberty, apparently consequent upon traumatism. There is formed a rapidly-growing lobulated tumor, which is attended by severe pain. Some of the lobules are so soft as to suggest cystic formation. Inflammatory symptoms are also present, but usually are not of a high grade. The lymphatic glands of the groin are very quickly involved.

The only treatment is amputation carried wide of the disease, and this offers practically no hope unless the disease is seen and recognized at its very earliest period.

Other tumors, such as fibroid and fatty, are observed, but so rarely as to constitute surgical curiosities. The question of removal, if they are non-malignant, will depend upon the amount of functional disturbance incident to their presence and upon the extent of cicatricial deformity dependent upon operation.

## Diseases of the Scrotum.

**Contusions of the Scrotum** are characterized by rapid extravasations, dependent upon the loose cellular structure of the dartos, and by

deep discoloration appearing early. The swelling may be very great. Unless the testicle be involved in the injury, the pain is not marked.

The treatment consists in the application of evaporating antiseptic lotions, preferably lead-water and laudanum, or muriate of ammonium and dilute alcohol, 10 grains of the former to an ounce of the latter. After the first two days the subsidence of the swelling and disappearance of the discoloration will be hastened by gentle massage and by the application of a neatly-fitting suspensory bandage. Sometimes, when in place of antiseptic applications poultices are employed, suppuration takes place. In the latter case the pus must be evacuated by free incision.

**Wounds of the Scrotum** are treated upon the same general principles as wounds in other parts of the body. Before closure hæmostasis must be absolute, since it is difficult to so apply pressure that oozing into the loose cellular tissues will be entirely prevented. These wounds are best closed by continued silk suture running about six or eight stitches to the inch. The skin edges should be accurately apposed.

**Skin Eruptions.**—The dermal surface of the scrotum is subject to the skin diseases appearing in other parts of the body, and is amenable to the same treatment. It must, however, be borne in mind that the skin of this region is exceedingly sensitive, and that an application—such as iodine, for instance—which would in other regions occasion no inconvenience may here cause great and prolonged suffering.

*Erythema intertrigo* is perhaps one of the commonest skin eruptions. This is treated by interposing between the scrotum and the thighs against which it chafes a layer of lint or absorbent cotton, or, better still, by the application of a suspensory bandage. The irritated skin is carefully cleansed by means of weak solutions of carbolic acid, 1 : 200, or hydrastis canadensis, 1 : 20, is dried thoroughly, and is dusted with very finely-powdered oxide of zinc.

Among the lower classes the presence of *pediculi* is a common source of irritation about the skin of the scrotum. The diagnosis is readily made by discovering the nits attached to the hair and observing the living insect, usually tightly adherent to the skin. The treatment consists in bathing the parts with bichloride-of-mercury solution, 1 : 1000, preceded by a thorough washing with alcohol and water. This treatment should be continued every other night for two weeks.

As a rare disease *prurigo* is sometimes observed. This is characterized by the pigmentary and structural alterations of the skin which are always the result of long-continued scratching. The initial lesions appear as small papules. Itching becomes most intense after the patient is warm in bed. The prognosis is bad. Relief may be obtained by weak carbolic lotions, solutions of menthol, or prolonged baths followed by vigorous rubbing in of green soap and tar.

Diabetes is sometimes associated with an irritable condition of the scrotum, which is remedied only by attention to the general disorder.

**Œdema of the Scrotum.**—In cases of general anasarca dependent on visceral lesion œdema of the scrotum often reaches a very high grade. When it becomes so marked as to threaten the vitality of the parts, the pressure may be relieved by multiple needle punctures, made under antiseptic precautions, since tissues thus infiltrated offer a feeble resistance to the ravages of micro-organisms if these latter are once introduced.

A purely local œdema may be occasioned by erysipelas or cellulitis, and is usually a sign of deep-seated pus. This local swelling is the almost invariable concomitant of extravasation of urine or perineal abscess, and indicates the necessity for immediate operation in these cases, since otherwise extensive sloughing will take place. The treatment consists in free incisions and in thorough drainage.

**Elephantiasis.**—This disease attacks by preference the negro. It is ushered in with acute inflammatory local symptoms, which subside, leaving a permanent enlargement. These attacks are repeated, the enlargement becoming more marked after each. The tumor formed may be upward of a hundred pounds in weight, and is characterized by its rugose surface and its dense fibrous mass. The swelling seems to have no unfavorable influence on the general health. Its removal is advisable, since it interferes with the procreative functions and mechanically occasions considerable disability. Excision of these tumors is often attended by very profuse hæmorrhage. This may be arrested by compression of the abdominal aorta or by the application of an Esmarch's tube, the latter being held in position by skewers. The testicle and penis should be preserved if possible, since when the growth has been thoroughly removed the sexual powers are restored.

**Tumors.**—*Fatty tumors* of the scrotum are at times observed. They are often intimately connected with the testicle, and can rarely be correctly diagnosed without an exploratory incision, since the sensation they give on palpation is very like that of omental hernia. The characteristic symptoms of omental hernia are, however, absent. Excision is the only treatment.

*Fibromata* are sometimes observed. These are freely movable under the skin, and present the hard, lobulated surface characteristic of these tumors as observed in other parts of the body. They should be removed as soon as discovered, since in their development they may form adhesions to the testicle which would render the ablation of the latter organ necessary to entirely remove the growth. These fibrous tumors sometimes exhibit a tendency to recur *in loco* in spite of thorough removal.

*Enchondromata*, *Osteomata*, and *Cysts* are occasionally observed,

and are amenable only to the knife. *Angiomata* are subject to the same treatment as in other parts of the body.

*Epithelioma*, or chimney-sweep's cancer, so called because it attacks by preference people engaged in this occupation, begins as an indurated wart, which exudes enough bloodstained discharge to make a scab. An ulcer quickly forms: this is characterized by indurated, raised edges, uneven surface, and the exudation of ichorous pus. It is sometimes exceedingly painful, and exhibits a tendency to progressive extension and the involvement of the inguinal lymphatic glands, which in turn soften and ulcerate.

The treatment consists in thorough removal of all the indurated tissue, together with any lymphatic glands which are found enlarged. When a case receives surgical treatment early the prognosis is good.

*Melanotic Sarcoma* is observed as a very rare disease of the scrotum.

## Diseases of the Testicle and its Envelopes.

**Hydrocele.**—As ordinarily used, the term "hydrocele" implies an effusion of serum into the sac of the tunica vaginalis testis. This effusion, however, may take place in the cord, where it may be diffuse, encysted, or congenital.

Vaginal hydrocele occurs with about equal frequency on each side of the body; it is not rarely double. In the latter case it is commonly associated with sterility, since the disease often originates in pathological conditions of the epididymis.

Hydrocele is a common accompaniment of epididymitis, orchitis, and solid enlargements of the testicle. As an acute condition it may be observed after traumatism.

The diagnostic signs of hydrocele upon which most importance are placed are—the presence of fluctuation, the pyriform shape of the tumor, which stands out from the body, the history of the enlargement, which begins at the bottom of the scrotum, and, above all, its translucency. This latter sign is best observed in a dark room. The skin over the tumor should be made *tense;* a lighted candle is held as close as possible to one side of it, while the observer, shading his eyes from the light, looks for transmitted light on the opposite side. A much more delicate means of making this test is afforded if the surgeon employs a tube, one end of which is applied to the scrotum on the side opposite to that which receives direct illumination, while to the other end is applied the eye of the examiner. In many cases this translucency is so marked that the position of the testicle is readily determined by the dark shadow which it throws. Hydrocele of the cord presents much the same diagnostic signs, and, sav-

ing in the congenital variety, cannot readily be confounded with other conditions.

In congenital hydrocele there is an opening from the abdominal cavity through the internal ring into the unobliterated peritoneal sac, which descended with the cord. Hence if fluid accumulates in this sac it can be made to disappear when the patient assumes the recumbent posture, and will give some impulse on coughing.

In certain cases the walls of the hydrocele become enormously thickened; in others the fluid, instead of being light straw-color, becomes dark and opaque. Under these circumstances the results of testing by transmitted light are of course negative.

The treatment of hydrocele may be either palliative or curative. The palliative treatment consists in evacuating the retained fluid by means of a trocar and canula. In performing this operation it should be borne in mind that the testicle usually lies at the posterior part of the tumor. This, however, is not invariably the case; hence before puncturing the position of this organ should be determined by the test of transmitted light, if possible; or, if this test is not applicable to the case, deep pressure in various parts of the tumor will when applied over the position of the testicle give rise to the peculiar sickening pain characteristic of traumatism of this organ. A trocar must be entered by a quick thrust into the sac made as tense as possible by pressure of the hand not holding the instrument. After evacuation of the fluid the trocar opening is closed by a small pledget of cotton held in place by means of iodoform collodion. The patient should be instructed to wear a suspensory bandage after this operation.

In children simple tapping is often followed by permanent cure. In adults this cannot be expected. At a period of time varying from a few weeks to a few months there will be a re-accumulation; hence, excepting in very old men, the radical cure is usually advisable. There are many methods of radically curing hydrocele, and all will perhaps, in the majority of cases, produce good results. Success depends not so much upon the method selected as upon the thoroughness with which this method is carried out. The most popular treatment is undoubtedly that by injection. After the fluid is thoroughly evacuated by means of a trocar and a canula, the nozzle of a properly-fitting syringe is applied to the latter, and, depending upon the size of the sac, from 2 to 8 drachms of tincture of iodine are thrown into its cavity. By manipulation this iodine is made to reach every portion of the sac. This stage of the operation is of prime importance, since otherwise only the lower surface of the sac may be reached, and hence the inflammation, which results in the production of plastic lymph and the obliteration of the space into which the serum was exuded, may be excited only over the small surface reached by the iodine. After the sac has been

manipulated so that the iodine has reached every portion of it, the canula, with the injecting syringe still attached to it, is withdrawn and the wound is dressed as before. This operation is attended with considerable pain, felt particularly in the hypogastric region and sometimes in the small of the back. The pain may last for hours, and require the free use of hypodermic injections of morphine for its alleviation. Shortly following an injection the tunica vaginalis becomes distended until it reaches even a greater size than obtained before evacuation of the serum. In the course of a week this swelling slowly subsides, and after three weeks has nearly entirely disappeared. If the operation has been carefully performed, the hydrocele will in the vast majority of cases not recur.

The funicular hydroceles observed in children are treated in the same way—first by tapping, then, if the serum accumulates, by iodine injections. The quantity of tincture of iodine injected is in these cases small, from 15 to 30 drops usually being sufficient. In the congenital hydrocele this form of treatment is attended with some danger, since the iodine may escape into the general peritoneal cavity and excite peritonitis. This may be prevented by firm pressure over the inguinal canal during injections, and the immediate withdrawal of all the iodine very shortly after it is injected. In this form of the affection incision and removal of the sac give the best results.

The hydroceles of children are often treated by passing through the sac a needle armed with a thread, leaving the latter in the wound to act as a seton. The fluid is slowly drained off and an obliterating inflammation set up. This treatment by seton is advised even in the congenital form of the effusion, but if it is adopted it should be carried out under all antiseptic precautions. I know of one unreported case of death due to this method of treating a congenital hydrocele. A local and general peritonitis was excited which rapidly proved fatal.

Carbolic acid may be used as an injection, and it is claimed for it that by virtue of its local anæsthetic properties it occasions far less pain than the iodine. A similar quantity is introduced by means of a syringe and canula, and the treatment differs only in the agent employed.

Recently incision and drainage and excision of the sac have been strongly advocated as means of radically curing hydrocele. These methods are more troublesome than injection, are attended with greater dangers of infection, and, in so far as reported cases are of value in basing conclusions, are followed by an equally high percentage of recurrences.

**Hæmatocele.**—Hæmatocele, or a bloody effusion into the tunica vaginalis, may arise from injury to the testicle or its envelope, especially if there is a pre-existing hydrocele. In this case the treatment

does not differ from that appropriate to injuries. Rest, elevation, evaporating lotions will cause rapid subsidence of the inflammatory symptoms. If fluid effusion in the tunica vaginalis still persists, it is to be treated on the principles already laid down.

Hæmatocele as ordinarily observed depends for its production upon a chronic inflammatory condition of the tunica vaginalis. Under such circumstances very slight traumatisms may readily excite repeated bleeding. When such cases come under observation the tunica vaginalis is usually very thick. There is an inflammatory exudate which becomes converted into fibrous tissue, and may indeed undergo cartilaginous degeneration. The fluid contained in the hæmatocele, at first crimson, becomes darker in time, until it finally assumes the appearance of chocolate. It may even grow thick and semi-solid in consistence. Sometimes the sac of the hæmatocele contains gas. In whatever way hæmatocele develops, it always has for its basis a diseased condition of the tunica vaginalis. The tumor may grow slowly, as in the case of hydrocele, producing no inconvenience excepting mechanically, or, on successive hæmorrhages taking place, may suddenly increase in size at short intervals. Sudden attacks of acute swelling and a fluid tumor of the scrotum are almost diagnostic of hæmatocele. These attacks are characterized, in addition to the tumefaction, by local and general symptoms of inflammation.

Hæmatocele has no tendency to spontaneous cure. On the contrary, it steadily increases in size. Kocher has reported two cases in which it finally underwent sarcomatous transformation, although it is possible that the sarcoma was in these cases the primary disease. In the early stage of hæmatocele the testicle is not seriously altered ; later, however, it undergoes irreparable damage. All hydroceles with the exception of those observed in infants may be converted into hæmatoceles. In the early stages of the disease, when the lining membrane of the serous envelope of the testicle has not become greatly thickened, the treatment applicable to hydrocele may be successful. When the walls of the sac become greatly thickened and rigid such treatment cannot be followed by good results.

After evacuating a recent hæmatocele, the contents of which are thick and contain clots, the cavity should be washed out with hot normal saline solution until clots and fragments of false membrane cease to appear. Iodine may then be introduced into the cavity, and the case may be treated as one of simple hydrocele. If suppuration should occur—and this is by no means uncommon—the pus must be evacuated by a free incision.

In chronic cases, when the walls of the hæmatocele are thick and rigid, injection offers no hope of cure ; here free incision is the favorite method. This incision should be so placed that the indications for

drainage are fully met. The whole cavity should be freed, as far as possible, of its false membrane by curetting. After this the raw surfaces may be touched with a chloride-of-zinc solution and packed with iodoform gauze, the latter being allowed to remain until it is loosened by exudation. It scarcely need be said that this operation must be conducted under the most rigid antiseptic precautions, and dressings must be repeated as often as indicated by the amount of discharge. When thus treated the cavity is closed by granulation and subsequent cicatricial contraction.

In still more chronic cases, when the walls of the cavity have undergone cartilaginous or calcareous degeneration, this method of treatment necessarily will be unsuccessful, the wound, instead of healing kindly, remaining as a fistulous opening. In these cases decortication is the preferable operation. The sac is opened as before, the position of the testicle previously having been determined by palpation if possible. The false membrane is freed at one point from the tunica vaginalis and the testicle, and by blunt dissection is separated until a point is reached where it is so adherent to the testicle that it cannot be removed. All the portion dissected up is cut away and the wound is dressed as in the case of incision. Decortication should only be employed when the stripping of this membrane is easily effected. This method of treatment is not applicable to very old cases, since the false membrane adheres so tightly that its separation is a matter of absolute impossibility.

In some cases the only resort is castration. This operation should be performed when neither irritating injection, incision, nor decortication promises success; that is, in old cases where the false membrane has undergone fibrous, cartilaginous, or a calcareous degeneration, where it is so tightly adherent that it cannot be removed entire, and where partial removal must prove futile, since the remaining tissue has such low vitality that it will be able neither to accomplish elimination nor spontaneous healing.

Castration may also be necessary after decortication from the intense pain caused by cicatricial contraction.

**Anomalies of the Testicle.**—Anomalies of the testicle may manifest themselves in departure from the normal either in development or in position. Anomalies of development may be characterized by absence of these glands, by congenital atrophy, or by hypertrophy. As much rarer conditions polyorchidism, or more than two testicles, and synorchidism, or the fusion of the two testicles into one, have been observed. Anomalies in position are included under the heads *ectopy* and *inversion*, the former term denoting that the organ is arrested at some point before it reached the scrotum; the latter signifying a malposition of the descended testicle.

Anomalies of formation are of course not amenable to treatment. It is important to bear in mind, however, that absence or atrophy of both testicles necessarily implies that the victims of such malformation are impotent as well as sterile. If one testicle remains normal in position and development, the sexual powers of the individual so affected will probably be perfect.

*Ectopy*, or incomplete descent of the testicle, is termed in accordance with the position of the gland abdominal, lumbar, iliac, inguinal, or cruro-scrotal. Under certain circumstances the testicle may be out of place, not because its course is arrested, but rather because it is diverted. The gland may then be found beneath the skin of the abdomen or in the crural region or in the perineum.

The vicious position of the testicle may be either unilateral or bilateral. Observations on the newly-born would indicate that a comparatively large number are affected by this malformation, but in infants at the time of birth the descent of the testicle is often not entirely completed, the normal position being reached months or even years afterward.

Ectopy is usually unilateral, and in the vast majority of cases is of the inguinal variety. Next in order of frequency comes iliac ectopy; the other varieties are exceedingly rare. Ectopy of the testicle is peculiarly liable to be complicated by hernia, which is generally of a congenital variety; that is, the gut passes into the tunica vaginalis, lies in direct contact with the gland, and is peculiarly subject to strangulation. The ectopic testicle is also subject to the diseases which are observed in the gland which is normally descended. Of these the most frequent is gonorrhœal epididymitis. Hydrocele, hæmatocele, and malignant diseases have also been observed in ectopic testicles.

The diagnosis of ectopy is sufficiently easy: the absence of the gland in its normal position, the presence of a tumor in the inguinal region, with the conformation of the testicle and sickening pain on pressure, are signs sufficiently characteristic.

Unilateral ectopy when uncomplicated produces no serious effect, and interferes with virility not at all. Double ectopy renders those who suffer from this anomaly sterile, but does not necessarily destroy sexual power. The complications of ectopy are, however, dangerous. The hernia which accompanies it is difficult to treat and readily becomes strangulated. Peritonitis may be excited by inflammation of the gland.

When ectopy is observed at birth it need not be concluded that this condition is necessarily permanent, since spontaneous descent may take place, usually, if it occurs at all, in a few weeks or months, though cases are cited in which it has happened at much later periods. The treatment of ectopy depends upon the position of the testicle and upon the presence or absence of complications. In the uncomplicated cases

observed during the first few months of life no operative treatment should be adopted, since the chances are in favor of the testicle spontaneously reaching its proper position. This hope may still be held until the tenth or twelfth year is reached. During this period of waiting the descent of the organ may be encouraged by gentle pressure from above downward in the direction of its normal position. In the absence of hernia active exercise is also advisable. Operative treatment is in the uncomplicated cases rarely needed, since the condition occasions no inconvenience, and since the chances of cure without resort to the knife are fairly good. When the gland has once escaped from the external ring, it should be prevented from again passing into the inguinal canal by means of a properly-fitting truss. If the age of ten or twelve years is reached and the testicle has not yet passed the external ring, an operation may be undertaken for the purpose of placing it in its normal position, since if this is successful the organ will probably become functionally perfect, whilst if it is allowed to remain in its abnormal position there is little hope of its ultimate descent, and absolute certainty that its proper development will never take place. This operation is particularly indicated when the ectopy is bilateral. It should be carried out by cutting down upon the testicle and dividing completely the fibres of the cremaster muscle and the tunica vaginalis. If the testicle previously has been movable, it can then be drawn into the scrotum and fixed there. Reported cases have shown that there is danger of retraction of the testicle when transverse division of the tunica vaginalis and its investing muscular layer is not made.

When inguinal ectopy is accompanied by hernia which can be reduced and held back by means of a truss or bandage which does not exert injurious pressure upon the testicle, the treatment should be conducted as in uncomplicated cases. If, as is frequently the case, the testicle is so placed that it is impossible to keep the hernia reduced without exerting undue pressure upon this gland, the hernia may be allowed to develop for a time if it is found that as it forces its way through the external ring it pushes the testicle before it. When the testicle has escaped from the external ring a truss can sometimes be so arranged that it will accomplish the double purpose of preventing the protrusion of the hernia and the retraction of the testicle. Frequently, however, the hernia will push forward and downward while the testicle remains in the inguinal canal. Under these circumstances no possible good can be accomplished by leaving the hernia untreated, while delay exposes the patient to the dangers of strangulation. In the adult, since there is no hope of the ultimate functional development of the gland, if possible both the hernia and testicle may be reduced together and retained within the abdomen by means of a truss. In children the question of accomplishing the

descent of the testicle and at the same time a cure of the hernia by means of operation will necessarily suggest itself. Where this is impossible the sacrifice of the gland would seem justifiable. In the adult, operation undertaken for the relief of strangulated hernia in cases of ectopy always should be made as radical as possible, and if, as is usually the case, the sacrifice of the atrophied and useless testicle is essential to the conditions of a thorough operation, there should be no hesitation in removing this gland.

When the misplaced testicle is placed so far back that it cannot be made to enter the inguinal canal, the advisability of operation need scarcely be considered.

When the testicle appears in the crural region and is complicated by hernia, it should be treated in accordance with the principles already laid down. Perineal ectopy may require operation from the inconvenience and pain consequent upon the exposed position of the gland. In at least one case operation was successful in relieving this condition: incision over the external ring exposed the cord; by means of traction upon this the testicle was removed from its abnormal position, and was placed in its proper position in the scrotum.

Inflammation of the ectopic testicle not infrequently occasions symptoms very like those of strangulation. This condition is commonly amenable to the treatment appropriate to inflammation; but if the symptoms persist and become aggravated, differential diagnosis is at times impossible. Under these circumstances an exploratory incision should be made for the purpose of determining the presence or absence of complications on the part of the bowel. This incision, by evacuating the effusion in the tunica vaginalis and by relieving tension usually affords prompt relief to the suffering. When the inflammation is frequently renewed upon very slight causes and occasions great pain and disability, removal of the gland is indicated. In fact, in any case where the symptoms are so violent as to require incision removal of the misplaced gland would seem to be the wisest procedure. This operation is attended by almost no danger.

By *inversion of the testicle* is implied an abnormal position in the scrotum. This is accompanied by no imperfection in development, and is only important when operation for hydrocele or hæmatocele becomes necessary: here an unrecognized malposition of the testicle may readily lead to wounding of the gland by the knife or trocar; hence when the position of the testicle cannot be determined by pressure or by the test of transmitted light, it will be safer either to enter the trocar upon the outer aspect of the tumor and in the position where fluctuation is distinct, or to confirm the presence of liquids at the proposed point of puncture by first introducing a fine aspirator or hypodermic needle.

**Wounds of the Testicle.**—Wounds of the testicle require no

treatment different from that of injuries to other parts of the body: even though the tunica albuginea be wounded, there seems to be little danger of the one-time dreaded hernia of the testicle if the wound is kept clean. Healing is usually prompt and uncomplicated. When the wound is a clean incision, suture of the albuginea may be advisable. When the wound is lacerated, and when there is doubt about the wound being aseptic, the opening in the albuginea should not be closed completely, room being allowed for drainage: this is best secured by means of iodoform gauze.

**Contusion of the Testicle.**—Contusion of the testicle, if severe, may be accompanied by such profound shock that life is threatened. Indeed, there are reported cases of sudden death due either to this cause or to cardiac arrest from the intense pain incident to this lesion. If the bruising is at all severe, it will give rise to an interstitial orchitis which ultimately results in the complete destruction of the testicular parenchyma. Even apparently slight injuries *may* be followed by complete atrophy. If both testicles are involved, sterility results, though this is not necessarily accompanied by impotence. This atrophy develops more frequently as a consequence of injuries inflicted before puberty than is the case if the testicle is bruised after this period.

The slight blows occasioning only temporary pain and not accompanied by subsequent swelling are of little consequence: it is only when, succeeding the traumatism, there is marked engorgement of the gland that the case can be regarded as one of true contusion and that the function of the testicle is liable to be seriously affected.

The treatment for contusion of the testicle is, immediately after the injury, that appropriate for shock, together with the administration of hypodermic injections of morphine for the relief of pain. Inflammation is subdued by rest in bed, free purgation, elevation of the testicles, and the application for two days of hot compresses wrung out in some weak antiseptic lotion and changed frequently. Where this treatment cannot be carried out, inflammation may be allayed by means of leeches applied along the course of the cord and by covering the scrotum with one layer of lint, which is kept constantly wet with lead-water and laudanum. On the subsidence of acute inflammation the patient must be instructed to continue treatment for at least three months, until every trace of inflammation or irritation has vanished. This treatment should consist in the administration of potassium iodide 5 grains three times a day, and the application of the pressure suspensory bandage described in the treatment of epididymitis.

**Orchitis from Strain.**—This variety of orchitis, the possibility of which has been often denied, undoubtedly exists. At times the testicle is involved; usually inflammation seems to be limited almost

entirely to the epididymis. I have seen several of these cases, and have been able by careful examination to eliminate diseases of the anterior or posterior urethra. The mechanism of this affection has been variously described, probably because it differs in individual cases. When the testicle is itself involved, the inflammation is due to the action of the cremaster muscles, which by suddenly drawing the testicle within the external ring expose it to a violent pinching action. In this case there is a distinct contusion incident to powerful muscular contraction. Sometimes the inflammation is caused by the bursting of a varicose vein. In this case the testicle itself is not involved, the inflammatory swelling being most pronounced about the region of the epididymis. The treatment is the same as for orchitis from contusion.

**Luxation of the Testicle.**—This gland may be displaced either from sudden violent contraction of the cremaster muscle or from direct traumatism. If the testicle is allowed to remain in its abnormal position, sooner or later it will become atrophied; hence every effort should be made to replace it. When the malposition has been occasioned by contraction of the cremaster muscle, replacement will usually occur spontaneously. Thus Kocher (cited by Monad and Terillon) reports the case of a man frightened during coitus. The two testicles were retracted to the abdominal rings, and remained there for five months; afterward they descended into the scrotum. Saint-Germain reports the case of a man both of whose testicles during a violent movement were retracted into the abdomen. They did not regain their proper positions for two and a half months.

If after waiting a reasonable time there seems to be no tendency for the testicles to descend to their normal position, an operation such as that described as appropriate for the treatment of ectopy is indicated.

Cases of traumatic luxation must be treated at once: here nothing can be gained by waiting. On the contrary, reduction is liable to become more difficult with the lapse of time. If possible, the testicles should be manipulated into place by direct pressure and by traction exerted on the cord. If this cannot be accomplished, there should be immediate recourse to operation.

**Epididymitis and Orchitis.**—The epididymis and testicle are so closely related that inflammation of one commonly implies that the other is involved, though this may be to so slight a degree as to be scarcely noticeable at the time of acute trouble, and as to entail no secondary evil consequences upon the part secondarily affected by the inflammation. Thus the inflammation occasioned by gonorrhœa nearly always attacks the epididymis, and remains practically limited to that structure, as does also the inflammation consequent upon traumatism applied to the posterior urethra.

**Gonorrhœal Epididymitis.**—The cause of this affection is invari-

ably gonorrhœal inflammation of the posterior urethra. As this portion of the urethra is not involved before about the third week of the gonorrhœa, it is at this time that epididymitis appears, although it may develop at any subsequent period of the original disorder. The epididymitis is heralded by pain in the groin and by a sense of weight in the scrotum. Examination shows a thickened, tender cord and an enlargement of the epididymis. As the swelling increases the skin of the scrotum becomes reddened, infiltrated, and adherent to the parts below, and the patient experiences intense pain, frequently of a sickening character. At the end of the first week the inflammation in acute cases is at its height. When the swelling involves the whole of the testicle, this is mainly due to the effusion of serum into the tunica vaginalis. The constitutional symptoms of inflammation are always present in well-marked cases, and the discharge from the urethra, if one has been present, is lessened. Epididymitis varies greatly in intensity. Frequently the disease is so mild that swelling and a sense of weight are the only noticeable symptoms. The intense pain which is noted in hyperacute cases is probably always due to exudation into the tunica vaginalis, since this pain is immediately relieved by a puncture which evacuates the contents of this sac. Epididymitis may be complicated by nocturnal emissions which seem to be due to hyperæmia of the seminal vesicles. When the testicle is also involved in the inflammation—and this does happen at times, though it is rare—pain becomes indescribably intense; the testicle is exquisitely tender on pressure and is found to be densely indurated. There is no great swelling of the gland, since this is rendered impossible by the unyielding tunica albuginea, but the constitutional symptoms are well marked.

Epididymitis may give rise to certain serious complications. Peritonitis has been described by Hunter as occasioned by involvement of the subperitoneal cellular tissue in an inflammation attacking the vas deferens. Other authors have described similar cases. I have seen at least one such case, though here the inflammation underwent spontaneous resolution. Pseudo-strangulation of the intestines—that is, symptoms so closely simulating strangulation that it was difficult to make a diagnosis—has also been observed as a complication of this inflammation. This seemed to be a reflex dependent upon the very great tension occasioned by the effusion of serum into the tunica vaginalis, since puncture and effusion of this fluid has been followed by prompt alleviation of the intestinal symptoms. Suppuration of the tunica vaginalis sometimes occurs. It is apparently never excited by the gonococcus, but is due to mixed infection. It is a much more frequent complication of the epididymitis following instrumentation than it is of gonorrhœal epididymitis. The suppuration in exceptional cases may even involve

the testicle. Necrosis of the testicle is also a complication of epididymitis and orchitis.

Epididymitis usually undergoes spontaneous resolution, leaving only some induration about the tail of the epididymis. In certain cases, if the disease has attacked both sides, long after the subsidence of acute inflammatory symptoms the patient will be found to be sterile. This is not always the case, and is, I believe, the exception rather than the rule. I have found as a result of examination of the semen of eight cases of double epididymitis that in all the testicular secretion contained spermatozoa. It is generally believed that bilateral epididymitis, even though it be of mild grade, necessarily entails sterility. That such a result does follow at times cannot be doubted. I have examined three such cases, finding the semen absolutely without spermatozoa. The reason for the difference of opinion upon this matter is probably to be found in the fact that patients who suffer from double epididymitis, and who are subsequently fertile, have no occasion to seek the surgeon's advice. Practically, all those who are sterile will sooner or later consult specialists. Even if the patient is sterile, this seems to interfere not at all with his sexual powers, nor is there any change in the conformation of his testicles.

A comparatively rare sequel of epididymitis is sometimes manifested in the form of neuralgia. The gland becomes so hypersensitive that the least touch produces as much anguish as would a sharp blow upon a normal organ. This symptom is usually associated with a tender, indurated node in the tail of the epididymis, and commonly disappears after a few months, especially if the testicle be supported and protected.

The treatment which I have found most successful has been conducted on the following lines:

First, *prophylactic*. Every patient with a gonorrhæa is instructed to wear a suspensory bandage, and is cautioned against violent exercise, venereal excitement, or other cause which will tend to produce the spread of the gonorrhœa into the posterior urethra. He is also counselled to look for pain or tenderness in the inguinal region or along the course of the cord, and when such is observed is directed to take a prolonged hot bath, retire to bed, and freely open the bowels by salines, the testicles at the same time being elevated by means of a suspensory bandage and a small pillow placed at the perineum. This treatment will in the very great majority of cases prevent epididymitis. The chances of the development of this complication may be still further lessened by keeping the urine mildly antiseptic by means of the administration of salol or boric acid by the mouth. Of these two drugs, salol seems to be the most powerful. It should be administered in 5-grain doses six times a day. If it occasions gastro-intestinal troubles or

kidney irritation, boric acid may be used in its place, 10 grains being given four times a day.

If epididymitis develops, a pressure suspensory bandage should be ordered. If the pain is very violent and the swelling well marked, the testicle should be thoroughly cleansed, and by means of a straight bistoury the tunica albuginea should be punctured posteriorly, allowing the escape of a few drops of serum. The patient should then be given the pressure suspensory, which should be applied without puncture when the pain is not marked. This suspensory, as described by Langlebert, consists first of an envelope of cotton applied about the scrotum, next a layer of rubber tissue covering the layer of cotton, and finally of a suspensory bandage made with a much more shallow pouch than those ordinarily sold, and provided with lacings at the sides, so that it can be tightened about the scrotum at will. The purpose of this bandage is to provide rest, elevation, pressure, heat, and moisture, all important elements in securing a cure. I have modified this bandage by making a shallow suspensory of mackintosh or india-rubber cloth gored at the sides and provided with lacings. This gives the impervious layer which keeps the part warm and moist. A layer of cotton is first applied about the scrotum; the suspensory, provided with straps on the army and navy pattern, is then applied, with the lateral lacings loosened; finally, these lacings are tightened, affording not only firm lateral support, but pressing the testicle upward against the pubis.

As to the efficiency of this treatment, it is possible to treat the great majority of patients suffering from epididymitis without putting them to bed for a single day. The pain is relieved within an hour; the patient is able to be up and to attend to light duties, and the course of the inflammation is materially shortened. Moreover, by the continuance of this dressing, with the addition of mercury-and-belladonna ointment, equal parts of each, to the scrotum of the affected side, the disappearance of the inflammatory nodule, which is commonly left in the tail of the epididymis, is greatly accelerated.

It is well to bear in mind the fact that *orchitis* may arise as a complication of various maladies; thus variola, scarlatina, rheumatism, gout, malaria, typhoid fever, and mumps may all be accompanied by distinct inflammatory involvement of the testicle.

In the orchitis of mumps the epididymis is very rarely affected. As an ultimate result of this affection atrophy not rarely develops. Inflammation of the testicle is sometimes coincident with tonsillitis. It is in this case usually slight, lasts but a few days, and undergoes complete resolution, though suppuration may occur followed by wasting. These forms of secondary orchitis are treated on the general principles applicable to the original disease, together with the application of the pressure suspensory bandage described above.

**Tuberculosis of the Testicle.**—Tubercular disease may manifest itself in the epididymis, in the testicle, or in any portion of the genital apparatus. The lesions are usually accompanied by alterations of the tunica vaginalis. Preceding the outbreak of the disease there are commonly prodromes which are exceedingly important from a diagnostic standpoint. These probably depend upon the fact that the disease is not confined to the testicle, but invades various portions of the genito-urinary apparatus. One of the most frequent prodromes of tuberculosis of the testicle is a recurrent painless sero-purulent discharge from the urethra. This discharge appears to be causeless, ceases spontaneously, and reappears again at irregular intervals. Coitus, drinking, and other causes not sufficient to account for discharge from a healthy urethra are usually given as the cause of the running. Frequent urination is also a common prodrome. On passage of a bulbous bougie there is found great tenderness of the neck of the bladder. This may be associated with tenesmus, which sometimes becomes so marked that there is occasional retention of urine. Seminal loss and hæmaturia are also common forerunners of general tuberculosis.

The developing disease usually first appears as a painless nodular swelling upon the head of the epididymis. It is not infrequently complicated by a mild grade of hydrocele. The two layers of the tunica vaginalis often become adherent in places. After a certain time softening takes place, a painless abscess forms and discharges a cheesy pus, leaving a fistula which does not close until the entire nodule has necrosed and been eliminated.

Occasionally the tubercular inflammation assumes an acute type. The swelling is rapid, and all the local symptoms are very like those of gonorrhœal epididymitis; but the course of the disease is such that a diagnosis is readily made. After the subsidence of acute inflammatory symptoms there are softening and abscess-formation, leaving a fistula.

The tubercular induration may very readily be confounded with that following acute epididymitis, or with the nodular formation which is not infrequently noted during secondary syphilis. The history of the case will throw much light upon the nature of the malady.

When the testicle is infected by the tubercular disease it is exceedingly difficult to diagnose the resultant tumor from malignant affections. Malignant disease, however, commonly invades the testicle primarily, and does not exhibit the small nodules characteristic of tubercular trouble. In certain cases a differential diagnosis is impossible. After softening and abscess-formation the disease can only be confounded with simple suppurative orchitis or with gumma. From the former a distinction may be made by the history of the case and its subsequent

course; from the latter, tubercular trouble can at times only be distinguished by the test of treatment.

Inoculation of the discharge into animals is a certain means of diagnosing tubercular trouble, but, unfortunately, this requires a period so long that it is of little practical value. This means of diagnosis has, however, several times been successfully employed in doubtful cases. In such cases examination of the seminal vesicles and of the prostate will be indicated, since extensive disease of the testicle is nearly always accompanied by involvement of these parts.

The treatment of tuberculosis of the testicle from the time of softening should be purely surgical. Previous to this time the application of belladonna and mercurial ointment and of the pressure suspensory bandage described under the treatment of Epididymitis may be adopted, in the hope of either keeping the disease latent or of accomplishing its resolution, though the results in the vast majority of cases will not justify any such hope. When softening takes place the abscess should be immediately incised, should be thoroughly curetted, and should be packed with iodoform gauze. Before opening the abscess it may be treated by aspiration of its contents and injection of 10 per cent. iodoform-olive-oil mixture. If in spite of this treatment the disease is steadily progressive, other nodules of induration forming and softening, and the cord becoming indurated, the safety of the patient is best consulted by castration. This operation is particularly indicated if there is no evidence of the disease in other organs of the body, and if the prostate and seminal vesicles are not involved.

**Syphilitic Orchitis.**—Syphilis may occasion in the testicle either interstitial inflammation or gummatous formation. It may also attack the epididymis.

Syphilitic orchitis is characterized by a hard, non-elastic swelling which may reach double or triple the size of the normal tubes. The gland feels extremely heavy, and usually presents nodular growths, though it may be smooth. The epididymis is often completely surrounded by the fibrous overgrowth. The disease is especially characterized by lack of tenderness and testicular sensation; firm pressure occasions absolutely no inconvenience. The only suffering is from the weight of the tumor. Hydrocele very commonly accompanies this affection. The scrotum may become adherent, and there may be slight local elevation of temperature. The progress of the disease is slow, weeks or months passing by without appreciable change.

If untreated, gummata may break down and discharge, with resultant atrophy of the testicle, or the swelling may gradually subside, leaving in place of the gland simply a small indurated nodule. The affection may develop with acute symptoms, but shortly its chronic nature will become evident.

When syphilis attacks the epididymis it appears as a nodule usually located at the head of the epididymis. This rarely becomes as large as the end of the finger. It is hard, indolent, and disappears under specific treatment.

Syphilis of the testicle in infants usually attacks both glands, though to a different degree. The lesions are disseminated through the whole testicle and develop progressively. This fact distinguishes them from the syphilis of adults.

The treatment of syphilis of the testicle is that appropriate to the general condition of the patient. When the disease appears early, mercury alone or mercuric iodide is indicated. When it appears late or is distinctly gummatous, iodide of potassium pushed to its extreme limit is employed. If this drug is not successful in causing disappearance of the symptoms, its action should be aided by inunctions of mercury, 1 drachm a day for twelve days, an interval of two weeks being allowed to elapse before repetition of the mercurial treatment. In addition to this general treatment an ointment composed of equal parts of belladonna and mercury should be applied to the entire scrotum. If there are discharging sinuses, these should be appropriately dressed and the whole should be included in a pressure suspensory bandage. Surgical interference is indicated only after the failure of constitutional treatment.

**Atrophy of the Testicle.**—Atrophy or wasting of the testicle may follow practically all the acute or subacute affections previously mentioned, particularly inflammation resulting from traumatism. Thus mumps, gonorrhœa, and rheumatic syphilis produce an inflammation which in some cases is followed by wasting of the gland. Hydrocele by direct pressure, hæmatocele, and ectopy all may be followed by atrophy. This atrophy takes the form of a sclerosis and occurs without preceding disease when old age is reached.

In addition, certain pathological conditions not immediately connected with the gland or its envelope may determine wasting; thus varicocele, by interfering with the nutrition of the part, is sometimes the cause of atrophy. This also follows lesions of the brain and spinal cord, particularly sclerosis.

As a consequence of atrophy, at times severe neuralgia may be excited, the pain resisting all treatment. If both testicles are wasted, the spermatozoa may disappear without impairment of sexual power, or complete impotence may result. If the wasting occurs before the age of puberty, the general development of the patient is profoundly altered, the condition termed "femininism"—*i. e.* that observed in the eunuch—obtaining.

As for the treatment of atrophy, it is of little avail. If the testicle has already wasted, there is no means of replacing the sclerosed

tissue by normal gland-structure. If it is in process of atrophy, the only chance of successfully arresting this process lies in striking at the root of the trouble. Thus in varicocele operative procedure may arrest the atrophic process, though it will never restore the gland to its former size. Following one of the inflammations which are known to result in atrophy, the affected testicle should be subject to long-continued treatment, since the cause of wasting seems to be the persistence of a low grade of inflammation which encourages the formation of the fibrous tissue. The best prophylactic treatment is secured by the application of the pressure suspensory bandage.

**Fungus of the Testicle.**—This is a disease observed only after the age of puberty and simulating in some respects malignant growth, but in so far as constitutional involvement is concerned it is entirely harmless. It requires for its development a pathological condition of the testicle, usually a wound which exposes this gland, or at least the surface of the albuginea, to infection. If the albuginea is uninjured, what is called the superficial fungus may form: this consists of exuberant granulations arising from the surface of the albuginea and appearing through an opening of the scrotum. When the albuginea is wounded the so-called parenchymatous fungus may develop. This is made up of a mushroom growth originating from the substance of the testicle. Such granulations may appear after any traumatism followed by suppurative inflammation. Thus, abscess, ulcerating gumma, and tuberculosis may all prepare the way for fungus. In tuberculosis these exuberant granulations develop very quickly. In syphilis, on the contrary, the development is exceedingly slow. The fungus when fully formed is apparently placed on the skin of the scrotum. On raising its under surface, however, the rounded opening in the scrotal skin through which it grows can readily be perceived. These granulations are not sensitive, and are rarely accompanied by pain.

In the superficial form of fungus—that is, outgrowth from the tunica albuginea—the testicle can be felt beneath the granulations unaltered in form, and by pressure on the region from which the fungus finds its origin the peculiar testicular sensation may be elicited. In the parenchymatous form of the disease the fungus seems to be a part of the testicle, and testicular sensation in the region of the growth is lessened or abolished. The discharge from these granulations is usually moderate in quantity, and they are not prone to bleed spontaneously. This disease must be distinguished from vegetating cancer. In the latter case the granulations bleed readily, discharge freely, and are placed upon a greatly enlarged testicle. By the time this condition is reached other symptoms of cancer are unmistakable.

The treatment of fungus of the testicle depends upon the cause of the affection. If ulcerative gumma is the original cause, the general

disease must be treated. Tubercular trouble should be removed with the knife and sharp spoon. Traumatic fungus may be avoided by keeping wounds sterile. If fungus should follow a simple wound which has not been antiseptically dressed, it may be treated by dusting with iodoform, iodol, or other antiseptic powder, and by compression. If this fails, the fungus can be removed by the knife, profuse bleeding being controlled by the cautery. In the parenchymatous fungus, where much of the testicular structure is involved, and especially where there is doubt as to the true nature of the affection, castration will probably offer the best means of treatment. If, however, there is very little involvement of the testicle, the curette and iodoform packing should be employed first.

**Neuralgia of the Testicle,** or the so-called irritable testicle, may depend upon demonstrable pathological conditions in or about the testicle, or may develop without appreciable alteration on the part of this gland. Neuralgia without appreciable lesion sometimes depends upon a spasmodic contraction of the cremaster muscle. Induration and atrophy have already been alluded to as causes of pain. Varicocele, hydrocele, nephritic colic, over-distension or disease of the seminal vesicles, inflammation of the prostate, all may cause intense pain located in the testicle. This pain may be accompanied by hyperæsthesia so great as to cause exquisite suffering on the slightest touch. The pain may be general or may be sharply localized, and is usually greatly increased by coitus. It may radiate through all the anastomosing branches of the spermatic plexus. The suffering varies greatly in intensity : there are often periodical exacerbations and remissions, the former in single instances having been so violent as to induce the sufferer to perform castration upon himself. When the disease is at all severe, rest in bed is the most efficient means of treatment. The bowels should be moved regularly, and the general condition of the patient should receive careful consideration and treatment.

The best local treatment consists in the application of cold : this to be efficient should be employed for many hours at a time. It may indeed be kept up with advantage day and night. It is best applied by means of a rubber bag made to fit around the scrotum. Two of these should be in service, one being freshly filled with cracked ice as fast as that contained in the bag already applied becomes melted. Leeches, active counter-irritation, and electricity are all methods of treatment which have at times yielded good results. In the milder cases it will usually be sufficient to apply the pressure suspensory bandage and administer internal treatment suited to the patient's general condition. Reflexes which might cause the testicular pain are carefully sought for and rendered non-active. Finally, if violent neuralgia occurs in an atrophied testicle, and if this is, moreover, associated with local

tenderness, and if the pain yields not at all to ordinary treatment, castration may become advisable.

**Spermatocele.**—Spermatocele, or cyst of the seminal gland, or, as it is perhaps more commonly known, encysted hydrocele, usually appears below the head of the epididymis and between that organ and the testicle. The contained fluid is usually grayish in color and shows on microscopic examination great numbers of spermatozoa. On superficial examination such a cyst usually appears adherent to the upper portion of the testicle, but a more careful examination will show that it is separated from this organ by an appreciable furrow. In the course of its development it becomes pear-shaped, with its greatest circumference placed above; the testicle at the same time has a tendency to take a transverse position in the scrotum. On examination this cyst is found attached to the testicle and moves with it, but is not merged into its substance. Such cysts may in their development mechanically occlude the vas, and thus prevent the escape of semen; hence treatment is indicated if they enlarge.

The treatment is very much the same as that applicable to hydrocele. Puncture, followed by injection of tincture of iodine, is usually succeeded by cure. If the disease still has a tendency to recur, incision and excision of the sac is a safe and sure operation.

**Tumors of the Testicle.**—All solid tumors of the testicle are classed under the general name of sarcocele. Aside from syphilitic and tubercular sarcocele, undoubtedly the commonest forms of solid tumors are the carcinomata, sarcomata, and mixed tumors. All these are malignant. Much rarer clinically are the benign tumors, such as the teratomata, myomata, lipomata, adenomata, angiomata, lymphangiomata, etc.

*Cancer* of the testicle may appear as scirrhus. The encephaloid is most frequently observed. In fact, it is the ordinary solid tumor of the testicle. It forms a large mass, soft on palpation, oval, with smooth surface, becoming nodulated only when it reaches such dimensions that the tunica albuginea begins to yield. Such cancers may readily undergo cystic degeneration, constituting a variety called cystic carcinoma.

The scirrhus, on the contrary, is characterized by a tumor of moderate size, scarcely ever larger than a hen's egg, and extremely hard.

Carcinoma of the testicle is usually generalized by way of the lymphatics. The first lymphatics involved are those in the lumbar region. These may acquire enormous proportions, even filling the entire abdomen. Sometimes generalization may take place through the veins. Generalization by means of continuity of tissue is rare, since the disease is for a long time limited by the tunica albuginea. When this

tissue yields, however, the disease rapidly invades the scrotum and involves the skin.

*Sarcoma* of the testicle offers no clinical features which will certainly distinguish it from encephaloid. It is characterized by the same rapid growth. The varieties commonly observed are the fibro-sarcoma, the myo-sarcoma, and the cysto-sarcoma. Other rare forms are described. Melanotic sarcoma is sometimes observed, but this is always secondary. Sarcoma differs from carcinoma in its mode of extension. The former involves contiguous tissues constantly recurring *in loco*. It is disseminated probably by means of the veins, although it does not always spare the lymphatics.

Cancer of the testicle very rarely involves both sides. Soft cancer develops at middle age, in the fourth decade. Old men are comparatively immune. The influence of heredity is exceedingly slight. Traumatism seems to be a distinctly predisposing factor. The first symptom noticed is usually enlargement of the gland, associated with a sense of dragging and weight. Testicular sensation—that is, sickening pain on pressure—disappears early. Lancinating pains are usually absent. There is frequently associated hydrocele. The cord is commonly increased in volume. When the disease is limited to the gland and does not involve the scrotum, the lymphatics of the groin are not swollen; the prevertebral lumbar glands are, however, early enlarged. Cancerous cachexia develops late. Death usually occurs in the third year.

The prognosis of carcinoma and sarcoma of the testicle is exceedingly grave. It is a question, however, whether early surgical intervention might not materially improve the statistics upon this subject. Unfortunately, ganglionic involvement takes place very early—according to Kocher's statistics within a very few months of the appearance of cancer. The soft cancer and carcinoma are particularly malignant. The prognosis of scirrhus is better. When malignant disease appears in infants the prognosis is practically hopeless, death taking place usually within one year. Even among young men the fatal issue follows early. The disease progresses slowly in old men. When the tumor grows rapidly, is soft, and appears in a young subject, even if operation is undertaken the chances of success are exceedingly slight.

Malignant disease of the testicle must be distinguished from syphilitic and tubercular involvement. The history of the case in syphilis, the early disappearance of testicular sensation, the nodular enlargement, the form of the tumor, which in syphilis is somewhat flattened, and finally reaction to remedies, are points characterizing syphilitic disease. When tuberculosis involves both the testicle and epididymis it may closely simulate malignant disease. Usually, however, involvement of other portions of the genital apparatus in the tubercular process,

together with nodulation and abscess-formation, particularly manifested in the region of the epididymis, will lead to a correct diagnosis.

Hæmatocele may so closely simulate carcinoma or sarcoma that the diagnosis cannot be determined without incision. The development of hæmatocele is, however, very rapid; the tumor is subject to sudden increments in size, the phenomena of acute inflammation being manifested at these times.

Between medullary carcinoma and sarcoma it is often impossible to make a diagnosis. Points which would lead to the inference of sarcoma would be the relative age of the subject, moderate hardness of the tumor, and absence of lymphatic involvement, together with enlargement of the cord and early involvement of the scrotum. Sarcoma more frequently originates in the epididymis than carcinoma, and hydrocele more commonly accompanies it. Sarcoma at times involves both testicles.

The only treatment applicable to malignant disease of the testicle is castration. Ligature of the spermatic artery, which has been advised, is absolutely useless.

*Cystic Disease of the Testicle* is a term which covers several different conditions. At times the tumors are glandular in structure, slow in progress, and would be classed as adenomata. Sometimes the microscopic examination shows that they are myxoid epitheliomata, and finally they may be in reality cysto-sarcomata.

The prognosis of cystic disease is favorable in certain cases, dependent upon the nature of the affection. The future of the patient can only be determined after removal of the testicle and microscopic examination of the specimens. When, in addition to simple cysts, cartilaginous or sarcomatous tissues are observed, the disease is of course malignant.

In cystic disease of the testicle castration is, of course, the only treatment, and this operation should be performed as early as possible, since the disease, often insignificant at first, rapidly undergoes malignant transformation.

*Enchondrosis.*—Enchondrosis of the testicle, which has too often been considered benign in its nature, and therefore on account of its slow growth and the absence of disturbing symptoms has not been subject to operative treatment, is always malignant. The disease becomes generalized and death follows. Operation should be insisted upon as urgently as though the diagnosis were that of a true cancer.

*Lymphadenoma* of the testicle appears as an elastic tumor, exhibiting no points of fluctuation and ordinarily accompanied by a slight exudation into the tunica vaginalis. The growth never reaches very great size, and in shape is much like an enlarged testicle. It occasions neither pain nor inconvenience excepting from its volume. The epi-

didymis is usually healthy. The disease sometimes attacks both sides, and may be accompanied by lymphatic enlargements in other parts of the body. This tumor becomes rapidly generalized; hence castration should be performed as soon as possible.

The tunica vaginalis may be the starting-point for tumor: lipomata, fibro-lipomata, sarcomata, and myo-sarcomata may develop from this envelope. Tumors originating from this structure are exceedingly rare.

## Diseases of the Spermatic Cord.

**Funiculitis.**—Preceding gonorrhœal epididymitis there is always inflammation of the vas deferens, which if it be of high grade will involve the surrounding structures, occasioning an acute funiculitis. It causes little pain, but can readily be detected by the indurated swelling consequent upon the inflammation. This funiculitis has been observed at times when the disease did not reach the epididymis.

In addition to gonorrhœa, other causes, such as rheumatism, may determine congestion and inflammation of the cord, characterized by heat, pain, and swelling, the latter on examination by transmitted light being somewhat translucent. This swelling occupies the whole extent of the cord from the external ring, and may accompany symptoms of rheumatism in other parts of the body.

**Œdema, or Diffuse Hydrocele**, of the cord is characterized by an enlargement of the spermatic cord, pyramidal in shape, with its base below and pitting on gentle continued pressure. It is sometimes exceedingly difficult to distinguish this affection from hernia; the diagnosis can, however, be cleared up by exploratory puncture. The treatment consists in subcutaneously puncturing the fibrous envelope of the cord and allowing the contained liquid to escape into the cellular structure of the scrotum, whence it is absorbed. Aspiration of the effused liquid will also successfully relieve the trouble.

**Diffuse Hæmatocele** of the cord is due to rupture of its blood-vessels. This may be occasioned either by external violence or may be consequent upon muscular effort. There is commonly a history of injury or strain, and on examination a fluctuating tumor is found occupying the position of the cord. At times there is considerable systemic shock. Even when rupture is due to muscular effort, ecchymosis commonly appears. The treatment should be rest, elevation of the part, pressure, and support.

**Tuberculosis of the Cord** is usually secondary to involvement of the epididymis. When it occurs independently, it appears in the form of rounded nodes upon an indurated cord. These nodes are prone to suppurate, forming typical tubercular abscesses.

**Syphilis of the Cord** may produce either sclerosis or gummatous formation.

**Encysted Hydrocele of the Cord** is commonly situated in the scrotum, although it may lie in the inguinal canal. It forms a rounded, movable, translucent tumor of slow growth. Fluctuation may be detected on examination. The cysts lying in the inguinal canal are often very movable, and may be entirely reduced. They can readily be distinguished from hernia by the fact that if they are pressed out through the external ring the inguinal canal will be found to be empty. The simple cyst of the cord is sometimes cured by evacuation. If this treatment is not followed by good results, alcohol, iodine, carbolic acid, or other irritating injection may be employed.

Blood may be effused into the cavity of the cysts, constituting encysted hæmatocele of the cord, or the tumor may be accompanied by hernia. At times this affection of the cord takes the form of congenital hydrocele; that is, the communication between the funicular envelope and the peritoneal cavity is still preserved. The characteristic symptoms accompanying this condition are the possibility of reducing the tumor by placing the patient in a supine position, and the reappearance of the swelling on standing erect or on making any effort. Absence of the characteristic hernial signs and the test of transmitted light will determine the diagnosis. A truss making firm pressure on the cord will usually cause obliteration of the sac by means of the inflammation thus excited. If not, the case should be treated as one of congenital hydrocele. In the early years of life some of the congenital cysts disappear spontaneously; hence it is well not to urge operation immediately after birth, but to wait for a time to see if this process will take place. Before making an irritating injection it is of course necessary to decide that there is no communication with the peritoneal cavity and if there is to take proper precautions.

**The Solid Tumors of the Cord** are the lipoma, fibroma, sarcoma, myxoma, and carcinoma.

*The Fatty Tumor of the Cord* forms a smooth, soft, semi-fluctuating, lobulated mass, very like that occasioned by omental hernia. The inguinal canal, however, in case of fatty tumor will be found to be free from involvement saving in the exceptional cases when the tumor sends prolongations in this direction. Since these tumors, if not interfered with, always reach considerable size, their removal should be undertaken as soon as the diagnosis is made. If the tumor has grown to any extent, its prolongations are so intimately merged with the cord and testicle that complete removal without castration is practically impossible.

In the treatment of all tumors of the cord the testicle should be spared if possible. When there is any suspicion of malignancy, how-

ever, the safety of the patient will best be consulted by castrating and dividing the cord at as high a point as practicable.

**Varicocele**, or dilatation and elongation of the veins of the spermatic cord, is one of the commonest diseases affecting the genitalia. In the early stage of this disease there are practically very few symptoms excepting those of cerebral origin, later there is a sense of dragging weight or often severe pain in the testicle, and sometimes characteristic features of marked sexual neurasthenia. On palpation a mass is felt, giving to the finger very much the sensation that would be revealed by a bundle of earth-worms; succussion on coughing can often be felt. The testicle is usually placed below and in front of the principal mass of veins. The deferent canal lies toward the posterior portion of the venous tumor. The disease is nearly always observed on the left side. It frequently occasions a partial atrophy of the testicle. This is especially the case when it begins in young men.

The treatment of varicocele may be either palliative or radical. The palliative treatment consists in careful attention to keeping the bowels soluble and the avoidance of violent exertion and long continuance in the erect posture. The patient is directed to wear a well-fitting suspensory bandage, supplemented night and morning by cold douches applied to the scrotum. In place of the suspensory bandage the testicle is sometimes supported by drawing the redundant portion of the scrotum through a ring and holding it there, thus making smaller the pouch which holds the testicle.

When the veins become much dilated the valves are incompetent; hence there is in varicocele a long unbroken column of blood which by pressure constantly aggravates the condition. By interrupting this column the blood-pressure may be greatly lessened; hence the application of a truss, usually condemned because its principle is not understood, may be an exceedingly valuable means of palliative treatment. This truss should press the cord at its exit from the external abdominal ring, and should be provided with a spring so regulated that the pressure is just sufficient to obliterate the dilated veins, but is not so firm that the normal circulation in the cord is materially interfered with.

The radical treatment comprises a large number of operations which have for their end the same object as that attained by a properly-fitting truss; that is, lessening of blood-pressure by obliterating the dilated veins. This indication is filled by all the operations of ligation, many of which are done subcutaneously, and all of which, in perhaps the majority of cases, give fairly satisfactory results. The column of blood may be greatly shortened by retrenching the scrotum, and operations performed with this object in view have, according to reported cases, been curative. As much of the skin as can be gathered

up loose about the testicles is seized in a clamp; this is then cut off; without removing the clamp the skin edges are stitched together. The operation is completed by the application of a moderately firm bandage.

I believe the best operation for the cure of varicocele consists in making a small incision in the scrotum, exposing the cord, opening its sheath, drawing out the diseased veins, ligating them as high up and as low down as possible, excising the portions lying between the two ligatures, and then shortening the cord by tying together the proximal and distal ligatures. This method of procedure enables the operator clearly to recognize the vas deferens, and also gives him an opportunity to include all the diseased veins. The wound should be closed without drainage by a continuous suture closely applied. The operation should be completed by an antiseptic dressing and pressure bandage, the crossed of the perineum being that which holds the parts in best position.

## Impotence and Sterility.

The terms impotence and sterility, often used as synonyms, in reality imply quite different conditions. In one there is inability to have sexual relations; in the other inability to procreate. Impotence indicates that erections are absent or feeble, whilst sterility implies that the semen is either absent, is lacking in spermatozoa, or is not ejaculated. The patient may be completely sterile and yet perfectly potent, or the conditions may be reversed. It is clear that power to perform this sexual act offers no indication of sterility.

**Impotence** is a condition much more commonly encountered than is sterility. It may be due to feeble or absent erections, or to a congenitally acquired peculiarity in the form of the penis. The fault is in the vast majority of cases dependent upon feebleness of erection. Erection depends upon an increase in the volume and rigidity of the penis, which in turn is due to congestion of the organ. This congestion is due to the dilatation of the arterioles and the engorgement of the cavernous and spongy bodies. Erections may be excited from cerebral or from spinal excitation. Erection from cerebral origin needs no illustration. Traumatism of the cord is frequently followed by prolonged priapism, whilst any irritation of the genital tract, as from fulness of the bladder, slight inflammation of the urethra, or a low grade of balanoposthitis, may be accompanied by frequent and vigorous erections.

Before deciding as to the relative or absolute impotence in a given case, it is well to know what may fairly be called a physiological limit. It is by no means uncommon for the specialist to be consulted by men of forty-five or fifty because of failing strength; even those of sixty-five or seventy occasionally consult the surgeon

for what they consider the premature decay of their powers. The normal standard for each individual varies so greatly that it is impossible to lay down a general rule. If any average can be given, however, I would state that a man who with benefit to his health has sexual relations on an average twice a week, the emission being delayed for from three to five minutes, and who, when occasion requires, is able to repeat the act twice in one hour, may be considered in a normal condition. Up to the age of forty there should be little loss of sexual power. After that erections become somewhat more feeble, and more effort is required to excite an orgasm. Between the ages of sixty and seventy the power usually departs entirely, though in some cases it is preserved far beyond this period. I know of one man who at the age of seventy-eight has begotten a child, and who states that his erections are as vigorous as in youth, and that he performs the sexual act frequently and satisfactory. This man's powers are possibly kept alive by his marriage with a young and a vigorous woman.

Impotence in the great majority of cases will be found to be associated with pathological conditions of the prostatic urethra. Chronic inflammation of this portion of the urethra exerts a profound influence on the spinal motor centres, producing an atonic condition which seriously interferes with the vigor and prolongation of the erection. Causes of hyperæsthesia or inflammation of the prostatic urethra are various. The usual cause is probably gonorrhœa which has invaded the posterior urethra, has never been cured, and has assumed a chronic form. In my own experience, next in order of frequency as a cause of this form of atonic impotence can be classed prolonged chastity in cases where the venereal instinct is strong and where the mind has long been given up to amorous desires.

Masturbation is generally cited as a prime cause of atonic impotence, though I believe this occasions far less trouble than is usually credited to it. Impotent patients who have masturbated not a dozen times in their lives attribute all their suffering to this cause. I have carefully questioned many of these patients as to the frequency with which they have masturbated and the number of weeks, months, or years that the habit was continued. Usually the effect has seemed to me entirely disproportionate to the cause. It must, of course, be borne in mind that impotence or any disorder of the genital apparatus is frequently associated with such a distinct lowering of the moral tone that truthful answers to questions are impossible. It is also true that the majority of these patients are abnormally sensitive to what they consider their degraded condition, and even to the surgeon on whose prescription they rely for cure are prone to paint their vice in its lightest colors. Considering these points, I still believe the evil effects of masturbation are greatly overrated, and am inclined to think that the

result is due not to this practice, but to long-continued meditation on sexual pleasures—to consequent prolonged congestion which does not receive its normal physiological relief. It must not be understood by this that patients are to be urged to actions incompatible with the strictest code of morals. There are other means of diverting local congestion and of averting the evils consequent upon it. It is certainly true, however, that the most successful method of curing those impotent from alleged masturbation is to have them happily married.

As to the question of the effect of prolonged and unsatisfied sexual desire, I have the record of one case completely impotent for a number of years consequent upon venereal excitement continued some months, and ungratified because of the scruples of the patient. This patient masturbated but once, and ascribed to this one act all his subsequent trouble. When masturbation is indulged in excessively it may occasion impotence, in this case due in part, if not entirely, to exhaustion of the nervous centre. It unquestionably determines at first acute hyperæsthesia and hyperæmia of the prostatic urethra. This is ultimately followed by a chronic congestion and by almost complete anæsthesia of the same region. When the practice has been carried to such an extent as to produce this latter condition, the prognosis as to cure is exceedingly unfavorable. The doctrine is very generally accepted by surgeons that masturbation is not more injurious than is sexual intercourse, provided each is practised to the same extent. In addition to gonorrhœa, prolonged sexual excitement, and masturbation, variocele, diseases of the testicle, sexual excess, the influence of drugs, such as bromide of potassium, tubercular or malignant disease of the posterior urethra, and sometimes inflammatory conditions of the prepuce or glans may occasion atonic impotence.

Impotence may be manifested clinically by feeble or partial erections. In one case the penis does not become rigid; in the other case the posterior portion of the organ may become rigid while the anterior portion is flaccid, or the reverse may be the case. It may be manifested by vigorous erection and premature ejaculation, followed immediately by subsidence of the erection, or finally erection may be entirely absent, an imperfect orgasm taking place with little or no change in the size of the organ. In this case desire is usually completely absent. The great majority of impotent patients apply for relief on account of precipitancy of ejaculation, but comparatively few are encountered in whom desire and power of erection are entirely absent.

Certain forms of impotence are amenable only to surgical procedures. Thus if erections are prevented by congenital deformities or cicatrices, or if the penis is displaced, or if it is masked by hydrocele or hernia or excessive development of fat or elephantiasis or tumor, operative treatment may render the patient again potent. In

some cases the organ is so poorly developed that a successful intercourse is wellnigh impossible. This is generally observed in those who have been continent. In such cases local exercise may act as beneficially as it does upon other parts of the body.

Amputation of the glans penis is not necessarily followed by impotence, since cases are on record not only of sexual congress, but of those followed by pregnancy after this operation has been performed. Removal of both testicles, certain troubles of the spinal cord, and wasting diseases are attended by a lack of sexual desire and power. In these cases treatment is of little avail.

In the vast majority of cases of impotence careful exploration of the urethra will show abnormal conditions, which may possibly act reflexly, lessening sexual power. By means of bulbous bougies or urethrometer the anterior and membranous urethra must be carefully searched for strictures, while by means of the same instruments, supplemented by rectal examination, the condition of the posterior urethra must be determined as far as possible. If stricture is found, and particularly if it is associated with a hypersensitive condition of the prostatic urethra, the first point in treatment is to remove these abnormal conditions. Where the bulbous bougie fails clearly to indicate any pathological condition, the whole urethra should be carefully explored by means of the electric urethroscope. This enables the surgeon to detect patches of hyperæmia, erosions, ulcers, or polypoid growths. Stricture, even though the narrowing occasioned by it is slight, indirectly excites or keeps up a congested condition of the prostatic urethra. It has been abundantly shown that irritation in this region produces a powerful effect, not only on the genital organs, but upon the system at large, the great majority of the so-called sexual neurasthenics being those who suffer from some form of posterior urethritis. The strictures found in such cases should be treated either by dilatation or by incision, in accordance with the indications of each individual case. Stricture having been cured, the next point is to cure any remaining congestion or inflammation of the posterior urethra. This may be accomplished in simple cases by the passage of a large cold steel sound, the instrument being introduced every third day. A still better means of treatment consists in the use of Winternitz's psychrophor. This is a hollow sound so constructed that the portion of the instrument which lies in the prostatic urethra can be kept hot or cold for an indefinite period. This instrument should be introduced for ten minutes every third day, water at about 40° F. being allowed to flow through it; or if heat is preferred the temperature of the water should be run up to between 106° and 110°.

If there are erosions, or if, in any case, the posterior urethra is exceedingly sensitive, the psychrophor should be supplemented by the

application of nitrate-of-silver solution by means of any of the various devices arranged for the purpose of carrying medicaments into the posterior urethra. Ulzmann's catheter syringe answers this purpose very admirably; or a hard-rubber syringe may be used provided with a long nozzle corresponding in shape with the curve of a sound and terminating in a bulb. This is passed into the urethra until the bulb overcomes the resistance of the compressor urethræ muscle and enters the membranous portion of the canal. Nitrate of silver is then injected; it passes along the prostatic portion of the urethra, and if a sufficient quantity has been injected, enters the bladder and mingles with the urine. I believe the best results are obtained by the use of a few drops (8 to 10) of a strong solution. This solution should vary in strength from 10 to 40 grains to the ounce.

Under some circumstances, when the sensitiveness of the prostatic urethra continues, and especially if it is associated with irritability of the bladder and a certain amount of tenesmus, the prostatic urethra should be dilated. Since this is the largest and most dilatable portion of the whole canal, it is obvious that efficient dilatation cannot be accomplished by means of a steel sound: a size sufficient to stretch the membranous urethra widely would have very little distending effect upon the prostatic portion of the tube. A special dilator is required for the purpose; either the Thompson or the Gross instrument will be found useful.

As a further means of lessening prostatic congestion prolonged hot rectal douches are exceedingly useful. These should be employed once a day, and a large quantity of water, at least two gallons, should be employed, a powerful stream being thrown directly against the rectal wall which lies in contact with the prostate, and being allowed to flow out again immediately, so that the bowel does not become distended. Electricity also affords a valuable adjunct to the treatment. The electrode should be introduced into the prostatic urethra and the faradic current should be employed, the other electrode being placed upon the perineum or in the anus. I have never been able to satisfy myself as to whether the good results of this treatment are to be attributed to the mechanical effect of the electrode or are dependent upon some occult influence of the electrical current. Be that as it may, patients often steadily improve from the inauguration of this treatment, even after the passage of sounds has been of little avail.

If the patient suffers from varicocele, and especially if he complains of pains in the testicle, and his attention is urgently directed to this as the cause of his trouble, it is well to remove this source of anxiety and possibly of disturbing reflexes by operation. The veins should be excised and the patient should be kept quiet in bed for two weeks.

In cases of atonic impotence as much good will be accomplished

by general treatment as by attention to local pathological conditions. Careful diet, abundant sleep, vigorous exercise in the open air, healthy mental occupation, complete abstinence from attempts at sexual intercourse, are matters of prime importance. Each patient should have his life as carefully regulated as would be the case were he training for an important athletic contest. Where the patient is well-to-do and is without occupation, the physician should so lay out his twenty-four hours that every portion of it is occupied, leaving him little time to brood upon his condition. In all these cases the mind is powerfully affected. This is a symptom of the disease, and should be considered as such, the physician avoiding the error of diagnosing the case as that of a *malade imaginaire* and dismissing him as such without further consideration.

In purely medical treatment I have little faith. A vast number of drugs have been ordered for this condition: this in itself speaks as to the inefficiency of medication. Distinct good is often accomplished by the administration of a powerful general tonic. A favorite prescription is made up of 20 drops of tincture of nux vomica and 1 drachm of dilute phosphoric acid in 3 drachms of Huxham's tincture. Damiana and phosphorus I have seen followed by a return of power, though how much this was due to these drugs I cannot state. Another favorite prescription is the combination of phosphorus, strychnine, and damiana given in the treatment of sterility. Hyoscine is said to have an admirable effect, as also hyoscyamine and belladonna: I have never employed any of these drugs. Cantharides in small doses seems to have a distinct aphrodisiac effect, as does alcohol if not taken to excess.

In regard to the psychical management of such a case, it is well to forbid the patient not only all intercourse, but all reading, thoughts, or associations by which the sexual passion may be excited: this prohibition should be kept up for several months. When power apparently is regained and the patient desires absolute proof of this fact, great care must be exercised lest from his undue excitement a temporary psychical impotence may result, which will plunge him into a distrust of his powers from which nothing can rouse him. I believe that in the majority of these cases it is best to interdict intercourse, without placing too much insistence upon this interdiction, or, if coitus is necessary, to have the patient so train himself that on some suggestions the cerebral stimulus may be materially lessened, and thus premature ejaculation may be avoided. Where the patient is educated and has a trained mind, the concentration of the latter upon some act of memory, such as recalling a recitation, or upon some calculation in mathematics, will often prove of distinct service in delaying emission. General muscular relaxation during the act of fornication, together with the infliction of pain, as by pinching or by

holding certain muscles in rigid positions, also tend to prolong coitus. With the same purpose in view the bladder should be evacuated before the sexual act, or if it is partially full the patient may concentrate his mind upon an effort to micturate. This is impossible during vigorous erection, but the mental effort will delay emission. Means directed toward lessening sexual excitement are applicable only in those cases in which the erection is strong, but ejaculation is premature.

Where erections have been deficient, and where after a prolonged course of treatment the occurrence of erection and emission during sleep, or if a morning erection incident to a full bladder show that the powers are partly if not wholly restored, and the patient insists upon making a test of his recovery, it is well to direct that he should sleep with a woman for seven nights without having intercourse. The fact that coitus is not expected of him will remove the powerfully depressing influence of dread and anxiety, and before the expiration of the time, if his cure is complete, he will usually have broken through the injunction given him, to his own satisfaction. Such treatment is not advised, but is only indicated when the urgency and insistency of the patient make it necessary to direct his sexual perversion so that it will do him the least harm.

In cases of absent or feeble erection, to endeavor to obtain a cure by means of lewd reading, of dalliance with women of loose character, is treatment absolutely to be condemned. In these cases the general and local treatment already given may be supplemented by spray baths applied to the perineum and about the genitals. These baths are repeated once daily in the morning, the temperature of the water being quickly changed from cold to hot, and alternating to cold again. Sometimes where the premature ejaculations cannot be prevented, it is well to advise the patient to make no effort to restrain this, but to allow it to occur with the least possible incident excitement and exertion, and to wait for recurrence of erection, when the act can be satisfactorily accomplished. Under these circumstances it is advisable to counsel a longer interval between sexual congress than where the act is performed but once.

Psychical impotence—that is, inability to complete the sexual act from fear or anxiety or from over-eagerness—is best treated by powerfully acting upon the imagination of the patient and by assuring him that his cure is certain. It is important not to be misled in these cases into the belief that the impotence is purely psychical, when it may in fact depend upon exhaustion of the reflex erectile centre from hyperæmia or inflammation of the posterior urethra or from irritation of any portion of the genital tract. When, however, careful examination of the urethra by means of a bulbous bougie and an urethroscope shows that it is in a normal condition, when nothing

can be discovered wrong about the anus, in any portion of the sexual apparatus, or in the spinal cord, it is fair to assume that if the history of the case given by the patient is in accordance with this hypothesis the case is one of psychical impotence. This may be temporary in its nature, as is sometimes the case with robust men recently married, in whom the mind has been powerfully influenced by fear of the results of masturbation or by the reading of quack literature. In other cases the psychical impotence may be manifest only in certain directions; thus some men are absolutely unable to have intercourse with their wives, and yet exhibit full powers when in company with other females.

Disgust, remorse, fear, any powerful emotion, may determine this form of impotence. Usually it is as transitory as the cause which gives rise to it. The form for which the surgeon is most frequently consulted is that due to the state of mind engendered by a course of masturbation, supplemented by the reading of lurid literature on the subject. The victims of this form of impotence usually seek medical advice when desirous of marrying. They are commonly continent men who for the purpose of trying their powers have consorted with some loose woman and have signally failed. This makes an impression upon the mind so strong that it may occasion an impotence which it is exceedingly difficult to cure. In these cases it is unwise to make light of the condition, since to the patient it is one of tremendous consequence, and one which so profoundly affects him that it is impossible for him to believe that it can be present without distinct palpable cause. Hence a careful examination of the entire genital apparatus is of great importance. This, if supplemented by the use of the electric light, usually makes a profound impression. All abnormal local conditions should be promptly and vigorously treated. Varicocele should be operated upon, circumcision should be advised if indicated, and even a slight degree of hypersensitiveness of the posterior urethra should be remedied by instillations of nitrate of silver, The general treatment applicable to atonic impotence is of service here. The alternating hot and cold douches, hot rectal injections, and medication are all useful. It is particularly important to insist npon constant occupation and upon active participation in all forms of innocent social amusement.

If a patient suffering from psychical impotence desires to marry, and if the surgeon has well assured himself that it is in reality a case of psychical impotence, it is well to urge that the marriage take place, assuring the patient that the course of treatment prescribed will get him in satisfactory condition before that time. It is well in these cases to insist that intercourse shall not take place for some days after marriage. To accomplish this end a distinguished surgeon gave his patient a number of pills to take, interdicting intercourse until the entire num-

ber given had been consumed. The remedy was satisfactory in its result, though but few of the pills were taken.

Sterility.—The term "sterility" implies that the power of ejaculating normal semen is lost. When coitus is possible, but is not attended with ejaculation, this is termed *aspermatism;* when there is ejaculation in which no spermatozoa are present the condition is termed *azoospermism.* Sterility may, of course, be combined with impotence, as is the case with eunuchs and with those who have suffered from atrophy of both testicles in youth. It may, however, be associated with a very high degree of sexual power, as is often observed in bilateral occluding epididymitis.

Even though there be an ejaculation of semen which under the microscope is found to contain numerous spermatozoa, sterility may still exist, since the spermatozoa may be void of life. In the normal semen the undulatory motion of the spermatozoa should continue for twelve hours after ejaculation. Sometimes, on account of evaporation, the menstruum in which the spermatozoa move becomes so thick that motion is impaired. It is restored, however, on the addition of a little weak alkaline solution. If immediately after ejaculation the spermatozoa are found to be motionless, even on the addition of an alkaline solution, the patient from whom the specimen is obtained may be considered sterile.

When there is deformity or a false opening, so that the semen is not properly ejaculated, this is termed *mis-emission.*

*Azoospermism* may be due to congenital absence, deformity, or misplacement of the testicles or their conducting tubes, to atrophy, degeneration, inflammation of the testicle or epididymis of both sides, or to malignant, tubercular, or syphilitic involvement of the secreting glands, to inflammatory obliteration of the epididymis and the vas deferens, though in this relation it is important to call attention to the fact that a double epididymitis by no means implies permanent occlusion of the vas or epididymis.

In addition to the organic changes dependent upon malformation or disease, there may be a more or less permanent form of azoospermism due to venereal excess, to nervous exhaustion, to general wasting disease as tuberculosis, to excessive indulgence in drugs such as morphine and alcohol, to diseases of the seminal vesicles.

*Aspermatism* may be due to obstruction of the common ejaculatory duct, to pathological alterations about the sinus pocularis, so that the semen is turned back into the bladder, to stricture or obstruction of the urethra, or to seminal fistula. At times there is loss of tone in the muscles concerned in ejaculation, so that there is no emission during intercourse. Aspermatism may also arise from an anæsthetic condition of the glans penis or of the prostatic urethra. Again, there is rarely

observed what may be called psychical aspermatism, the patients in these cases being unable to complete the sexual act with certain individuals, these usually being their legitimate partners.

The treatment of sterility will depend, of course, upon the cause of the trouble. If it is due to destructive lesions of the testicles or to obliteration of the vasa deferentia, the prognosis is practically hopeless. Under other circumstances, however, much can be done by treatment. Thus if emission is prevented by stricture of the urethra, the cure of the narrowing would of course cure the sterility.

When aspermatism is found to be dependent upon an atonic condition of the ejaculatory muscles, which in turn is due to chronic inflammation of the prostatic urethra, the use of the cold steel sound, instillations of 3 per cent. solutions of nitrate of silver or sulphate of copper, the use of hot rectal douches directed against the prostate, and tonic treatment, generally succeed in accomplishing a cure. In the rarer cases, where the inflammation has lasted so long that hyperæsthesia of the prostatic urethra has given place to anæsthesia, after the treatment directed to the subduing of inflammation the hot psycrophor, together with the application of the faradic current to the prostatic urethra by means of an electrode, will be found serviceable. In addition, the patient should receive full doses of strychnine, phosphorus, and damiana. An excellent prescription in these cases is as follows:

℞. Strychninæ sulphatis, gr. $\frac{1}{40}$;
Phosphori, gr. $\frac{1}{200}$;
Extract. damianæ, gr. iij.—M.
Ft. pil. No. 1.
Sig. Take two such pills three times a day.

Where the aspermatism is dependent upon an anæsthetic condition of the glans penis the application of the electric brush is commended by Gross. Curling succeeded in curing one such case by blistering the glans.

The psychical forms of aspermatism are difficult to reach excepting by means of powerful mental impressions. Whiskey pushed to its full stimulating effect will sometimes be of temporary service, but will rarely produce any permanent benefit.

Azoospermism, if dependent upon cryptorchidism, may sometimes be relieved, when treatment is undertaken early in life, by causing the descent of the testicle to its normal position either by mechanical appliances or by surgical operation. When syphilis invades the testicle and causes absence of spermatozoa, their reappearance is usually coincident to the yielding of the symptoms to mercurial treatment.

When the condition depends upon debility or sexual exhaustion, general tonic treatment is indicated. Obliteration of the duct as a consequence of bilateral epididymitis, if seen shortly after an acute attack, is amenable to treatment by elevation, heat, moisture, and pressure, together with the application of belladonna-and-mercury ointment and the administration of small doses of iodide of potassium, 5 grains three times a day. This treatment should be continued for many months. Tubercular or cancerous azoospermism is of course beyond cure.

### Spermatorrhœa.

Spermatorrhœa implies an escape of semen without either orgasm or erection. As the term is generally used, it also includes cases of frequent pollutions, whether in the day or at night. This term is frequently employed to designate the condition which is more properly termed prostatorrhœa, since in the latter case the fluid escaping from the urethra is the prostatic secretion and contains few or no spermatozoa.

Pollutions occur in the great majority of cases at night. It is impossible definitely to state what is the normal number in unmarried men who lead chaste lives. Certainly one in two weeks should not be considered abnormal. A better test as to whether these pollutions are designed as a relief to overcharged vesicles or are due to hyperæsthetic condition of the reflex centre is afforded by the after-sensations of the patients. If they experience no ill effects, the loss can be regarded as physiological. If, on the contrary, they are languid, dull, heavy, and suffer from pains in the back, it may be fairly suspected that such emissions are due to a pathological condition and are exerting a deleterious effect upon the health of the patient.

Pollutions during the day are comparatively rare. They occur as a result of slight venereal or mechanical irritation. They are rarely accompanied by full vigorous erections. I saw lately one patient who could not retract the foreskin for the purpose of cleaning the coronary sulcus without experiencing partial erection and pollution. Another patient, a farmer and chaste as to women, was unable to pursue his ordinary work because the jolting of the wagon caused repeated pollutions.

The most aggravated cases of spermatorrhœa—and indeed, strictly speaking, these only should be classed under the heading—are those in which there is an almost constant discharge of semen without either erection or pleasurable sensation. I believe that such loss is exceedingly rare. It is asserted, however, on sufficiently good authority, that spermatorrhœa dependent upon an atonic condition of the muscular fibres of the orifices of the ejaculatory ducts may exist. Furbringer states that about 15 per cent. of the cases of chronic gonorrhœa suffer

from a mild form of spermatorrhœa, as shown by the presence of spermatozoa in the urine. The symptoms incident to these various degrees of spermatorrhœa become intense as the disorder is aggravated. As the nocturnal pollutions are more frequent, as diurnal pollutions occur, erections are less vigorous, ejaculations are premature, and a very profound effect is produced upon the mind. These patients become typical sexual neurasthenics, with complaints and symptoms as many as are observed in hysterical females. Pains in the back, hypogastric region, and inner surface of the thighs, dyspepsia, palpitation, and loss of mental grip or power of concentration, together with headache, are perhaps the most frequent symptoms. The mental condition may deepen into hypochondriasis or into insanity. Masturbation, long-continued indulgence in erotic thoughts, prolonged sexual excitement without natural gratification, pruritus, gonorrhœa, sexual excess,—all these causes, by exciting a hyperæsthetic condition of the prostatic urethra, often associated with subacute inflammation and consequent exhaustion of the lumbar reflex centres, may produce a more or less severe form of spermatorrhœa. Certain general conditions may occasion pollutions. Thus in convalescence from acute fevers, progressive muscular atrophy, in paraplegia, and locomotor ataxia, nocturnal pollutions are not uncommon.

The treatment of these cases depends, on the first place, upon removing every possible source of local irritation. It is important that these patients should have some steady occupation, preferably in the open air; that their lives should be carefully regulated in regard to diet, exercise, bathing, and sleeping; that they should avoid tobacco and liquor. They should sleep on a hard bed, should be lightly covered, and should wear some apparatus which will keep them from sleeping on the back. A towel knotted in the middle, with the knot placed over the spine, will accomplish this. They should have the bowels open, should empty the bladder immediately on retiring, and should again micturate about the middle of the night, rising for this purpose. Erotic or sexual excitement of all forms must, of course, be interdicted. If there is phimosis, it should be relieved by circumcision: a congenitally narrowed meatus should be cut to its full normal calibre. Stricture should be cured either by dilatation or division. Subacute posterior urethritis should be treated by the hot or cold sound, by instillations, by soluble bougies, by rectal douches. Any pathological condition about the anus should be corrected. Thus piles should be operated upon, fistulæ cured, fissures properly treated. If abnormality of the testicle is found, this also should receive attention, since by its reflex action it may keep up the seminal loss. Thus varicocele should be operated upon, especially if the patient's mind is directed toward this as the source of his trouble. Hydrocele should be

cured; neuralgic pains of the testicle should be relieved by means of a carefully-fitted suspensory bandage. Since seminal loss, at least in the early stages of spermatorrhœa, is due to hyperesthesia of the spinal centres, treatment should in this stage of the disease be sedative rather than exciting. Prolonged sitz-baths are of service. The galvanic current is highly recommended by some authorities. Counter-irritation over the spine and the perineum will be found of service. Bromide of potassium and fluid extract of gelsemium are particularly valuable. They may be combined with atropine. Anæmia, malaria, struma if present, should all receive their proper treatment. A great many of these patients exhibit a marked pallor, one far greater than is justified by examination of the blood. Although there is no deterioration of the hæmoglobin or in the corpuscular count, they seem to be benefited by iron and arsenic, and particularly by small doses of the bichloride of mercury, $\frac{1}{60}$ of a grain three times a day. Hyoscine in doses of $\frac{1}{150}$ of a grain, given at bed-time, often prevents pollution.

In the more aggravated forms of spermatorrhœa, in which pollutions occur both night and day, and particularly where erections are feeble or absent and there is a tendency to a constant flow of alleged seminal fluid, the direct application of the galvanic current is indicated, one pole being placed in the prostatic urethra, the other in the rectum. In these cases the hot psycrophor can take the place of the cold instrument; cold sitz-baths, cold douches, and hot rectal injections are serviceable. Ergot is recommended in doses of $\frac{1}{2}$ a drachm three times a day by Mitchell, and strychnine should be pushed to its physiological extent. Cantharides, phosphorus, and damiana are also of service. When the disease is dependent upon serious central nerve-lesion, of course local treatment is of little avail. During the course of treatment indulgence in the sexual act must be interdicted, and if the patients are single and are suspected to be masturbators, a powerful mental impression must be made in regard to the results incident to this practice. It is common to advise marriage as the treatment for these cases. Under some circumstances this is good advice—namely, when the prostatic irritation is dependent upon no distinct lesion, when it yields to treatment, but when pollutions still are frequent, dependent upon ungratified sexual desire.

### Satyriasis, Nymphomania.

Satyriasis is a term applied to a mental perversion characterized by such overpowering lust that the proprieties and decencies of life are sacrificed at any or all times for the purpose of attempting indulgence in sexual pleasure. This condition when observed in females is termed nymphomania. It is frequently associated with impotence, and is to be classed with the psychoses rather than with functional disorders. It is

commonly observed among those of neurotic tendency, particularly where such patients have led sedentary lives and have been given over to lascivious thoughts or reading without opportunity for sexual indulgence. Sometimes the sexual power seems to be commensurate with desire, so that intercourse can be repeated far more frequently than is possible in the normal state. Sometimes this is the only form in which insanity manifests itself: it is most frequently, however, associated with other manifestations of mental alienation. Wounds, injuries, and inflammation of the central nervous system have all been followed by abnormal sexual appetite. At times the exciting cause of the disease seems to depend more upon some abnormality of the genital tract, though I believe that in a healthy individual such a cause is not sufficient to produce satyriasis.

As in all mental diseases, it is often impossible to distinguish between healthy function pushed to its extreme limit and disease. The lives and practices of many whose health seems unimpaired, who maintain their positions in the world, and who are universally esteemed, are such as to rival the performances of those who exhibit the milder forms of satyriasis. It is only when the judgment is put completely in abeyance by imperious desire that such persons are considered diseased.

Various forms of sexual perversion are closely allied to satyriasis, and, like this condition, must be classed among the psychical diseases. Thus there are neurotics who conceive a passion for certain animals by means of which they obtain sexual gratification; others require for their enjoyment intercourse with persons of their own sex, playing at times the active, at times the passive rôle. Others can feel sexual pleasure only while caressing the hair of a woman who has taken their fancy.

The treatment of satyriasis must in the main be similar to that appropriate to the treatment of allied nervous disorders—constant occupation in the open air; continued oversight; rigid attention to diet and the condition of the alimentary tract, to bathing, to everything which will improve the general health; the removal of any source of irritation about the genitalia, such as a tight foreskin, seat-worms, hæmorrhoids, varicocele, or scrotal tumor; the curing of any chronic inflammation about the neck of the bladder.

Hydrotherapy seems to be particularly serviceable in the treatment of this affection. Drugs render but a temporary benefit, but, since satyriasis appears at times as simply a temporary form of insanity, these may be indicated. Bromide of potassium and hyoscine are the two remedies on which chief reliance can be placed in allaying the violence of the attack.

Clitoridectomy and castration have been practised for the relief of this condition, but with such a slight amount of success that the operation is not justified.



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